

THE RUBBER INDUSTRY OF THE AMAZON

AND HOW ITS SUPREMACY
CAN BE MAINTAINED

BASED ON THE EXPERIENCE OF

JOSEPH F. WOODROFFE

Author of "The Upper Reaches of the Amazon"

EDITED AND WITH ADDITIONS BY

HAROLD HAMEL SMITH

Editor of "Tropical Life"

With a Foreword on the Latin-American Indian

BY

VISCOUNT BRYCE, O.M., P.C.

48 ILLUSTRATIONS

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FOREWORD
ON THE LATIN AMERICAN INDIAN.
By THE RT. HON. VISCOUNT BRYCE, O.M., P.C.

LONDON,

April 3, 1915.

MY DEAR SIR,—I am much interested to hear of your book and wish it all success. I do not propose to write anything regarding the Monroe Doctrine at present, for, as Colonel Roosevelt pointed out, it is not fitting for a man to deal with a matter of such importance unless he is in a position to say something that he can justify by full argument, which I cannot do at this moment. Those interested in the matter, however, as you seem to be, can refer to what I have said on the subject in my book on South America, pp. 509-510, and can study the views expressed by Professor Hiram Bingham in the original in his book, "An Obsolete Shibboleth," and the criticisms made by American writers on that book. I also believe that there has been considerable correspondence generally on the subject in the United States.

I have been particularly interested in what you say in the section on labour about the native tribes of the Amazon Forest, who have been shockingly treated, in olden times by the Brazilians, and latterly by some of the lower sort of Peruvians, and I dare say by men of other nationalities also. You are right in thinking that an effort should be made to protect these tribes and preserve their labour. Some of them are docile and industrious in their own way and

capable of being educated if they were handled with consideration and, above all, with justice. It is the unjust oppression practised by so many of the whites which has turned these tribes against us, the European races, kept them at a low level, and made their work of no benefit except when given under compulsion, and of much less value even then than it would be under conditions of freedom. Owing to this I am glad to see that you pointed out, nearly three years ago, just after the publication of the Putumayo Report,* that, however uncertain and unsatisfactory the Brazilian native labour may be, if Latin America is to be of permanent value as a producer of foodstuffs and raw materials to herself, to ourselves, and to others, steps must be taken at once, not only to stop the atrocious policy of cruelty and decimation which went on in the Putumayo region, but also to enable the number of natives to increase by the natural growth of population under proper conditions. In a word, instead of reducing 30,000 Indians to 10,000 in a few years, as the Putumayo Report shows was done, we must rather care for and look after 10,000 until they become 30,000. If this is not done, trouble of a serious character will befall the regions mentioned, as well as Europe, so far as it depends on Latin America for supplies and a return on money invested out there. The concluding paragraph of that article of yours can, perhaps, also be reproduced here with advantage, so that those who did not see it in the original can do so now; you ended by saying that: "When our investments in Latin America suffer by their railways being still and their docks are deserted and idle for want of freight and traffic through the absence of labour; when many of our factories have almost ceased work for want of orders from overseas, or through lack of tropical products

* See *Tropical Life*, August, 1912, p. 151.

at home, then, perhaps, John Bull and Uncle Sam will wake up to a sense that all is not well—wake up, that is, to cure the disease only to find the patient already dead.”

The proper development of these magnificent regions of Latin America is one of the greatest questions in the future of the world, and you are deserving well of mankind in calling attention to it and stating the conditions of the problem. I understand that you have stated this more fully in the book than is apparent in the section you sent me, and that, at the same time, you have estimated the possibilities of rendering habitable those regions which now suffer from malaria and great floods along the rivers. As soon as the War comes to an end, all this should start an extremely interesting discussion, which could be of benefit both to British trade and the countries themselves.

In conclusion, I see no reason to think the United States would be disposed, in spite of the way in which some interpret its Monroe Doctrine, to throw any obstacles in the way of British capital being invested in the Amazonian districts so long as it was not applied to establishing any sort of political control, and so long, of course, as it was in honest and capable hands.

I am, faithfully yours,

Bryce

H. Hamel Smith, Esq.

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INTRODUCTION.

By THE EDITOR.

THIS book has been written to show how the supremacy of the rubber industry of the Amazon can be maintained and consolidated, in spite of the increasing seriousness of the competition to which it has lately been subjected by the plantation rubber now produced in the East, and that, too, without harming its Eastern rival, as most think it must do, if it is to survive. The means suggested to Brazil are: (1) To make the collection and preparation of rubber for export subsidiary to agricultural, stock-raising, and other industries, and not the main and, in fact, the sole industry that it can well claim to be at present. (2) To increase the population of Amazonas by the introduction of Chinese, Japanese, and other races to clear and settle on the lands available up the Amazon, and whilst forming homesteads and small farms, to tap and cure rubber to obtain "pocket-money," whilst their women and children do the lighter work on the home farms. (3) To ditch, drain, break-up, and cultivate the flat, open lands in the rubber zone; to clear and also drain the forest areas year by year for the Government, thereby rendering the 300,000,000 untouched rubber trees believed to be there available for tapping, whilst the forests would be exploited for their timber and other products, and cattle, and especially pigs, introduced (the latter to keep down the snakes), to increase local food supplies, and build up an export trade in meat products.

All these suggestions have been carefully considered and discussed, in order that, if for no other purpose, they can be made the basis or stepping-stones for other means that seem likely to prove more successful.

Personally, I attach great importance to the subjects treated in the first and last sections in the book, and especially to the last one dealing with the Monroe Doctrine and the degree to which its present interpretation may tend to discourage the further investment of English and British Colonial capital in the Republic. For this reason I approached Colonel Roosevelt in America, and Viscount Bryce over here, and, sending them copies of these two sections, asked each if he could, by chance, spare the time to write a short Foreword on the subjects treated; the ex-President, as representing the American view, and Lord Bryce, as a leading authority for England, since he, as well as Colonel Roosevelt (who has only recently returned from his "Journey in the Brazilian Wilderness"), have both had the advantage of studying in South America these and other knotty problems concerning Latin America, its politics, and people.

Unfortunately, so far as the American view of the question is concerned, I failed to attain my object, receiving the following letter in the negative from Colonel Roosevelt. With the turn things have taken of late in America, I was afraid this would be so, and am indeed surprised at receiving anything more than a bare acknowledgment. I now take this opportunity of thanking the ex-President for troubling to express his opinion on the matter as he has done, thereby confirming my views as to the importance of the queries raised in these sections, and (indirectly through them) elsewhere in the book. I have much pleasure in reproducing the letter on the opposite page to enable my readers to see exactly what its writer had to say in reply to my request.

THEODORE ROOSEVELT

THIRTY EAST FORTY SECOND STREET
NEW YORK CITY

February 19th, 1915.

My dear Mr. Smith,

You are very kind; but I simply have not the time to write the only kind of piece I should be willing to write on such a subject. I do not write easily and I am not willing to deal with a matter of importance unless I say something that I am content to abide by. I have no chance to do that now. With regret,

Sincerely yours,

T. Roosevelt

H. Hamel Smith, Esq.,
Editor "Tropical Life."

Thanks, however, to the page out of a South American Supplement of the *Times* that I recently found among my notes, I am able to give my readers some idea of Colonel Roosevelt's pronouncements on the Doctrine, as well as to show what is the opinion of leading Latin Americans on the ex-President's views.

Lord Bryce, as his Foreword shows, also skirts round the Monroe Doctrine for the same reason as Colonel Roosevelt; at the same time he was good enough to touch upon it sufficiently to enable one to gather what his views on the subject would be if put to the vote. This is especially apparent in the reference he makes to Professor Bingham's book on the subject, and also in the extract from his own book on South America, from which I quote at the end of this volume, on p. 386. Between one and the other of these references one can gather fairly easily the opinion of the distinguished writer of the Foreword on this vexed question.

This being so, then we are fortunate in having also secured Lord Bryce's views on the question of the treatment, utilization, and what I can best term as the domestication of the native Indians, and indeed on the aborigines generally, whether in South America or elsewhere. For the good of the world as a whole, both for the happiness of the natives as well as for the trade and comfort of the white races, Europe and America badly need this native labour to-day, and are certain to do so more and more each year, as the demand for tropical products increases, which it is doing rapidly; everything, therefore, must be done, and a start made at once, both to stop the criminal and inhuman treatment of the native tribes and races in all parts of the world, and to further increase their numbers considerably. If something is not achieved very soon in this way the "white" continents will soon be calling out for supplies of foodstuffs for their homes, and raw materials for their factories, and

they will call in vain, for being totally unfitted to stand the life of toil under the tropical sun that is the lot of the dark-skinned people, we have no one to take the place of the latter, who will soon practically disappear off the face of the earth if steps are not taken to conserve what we have and then to increase their numbers. The marvel is that such wanton destruction of this, the most valuable of all the tropical "products," has been tolerated so long. If Formosa were to burn out her camphor forests, India or Java their bark trees, or Ecuador, Malaya, and other centres their cacao, rubber, and coco-nut plantations, we should indeed think that they were bereft of their senses, and perhaps (needing the produce) take concerted action to stop such wanton destruction. To destroy these crops, however, in such a fashion, stupid as it would be, cannot be compared, so far as the welfare of the universe is concerned, for sheer criminal wantonness to the mania that has always existed with the whites, and the coloured half-breeds under them, to work or otherwise ill-use out of existence the darker-skinned people with whom they have come into contact. Such conduct, slowly but surely, removes for all time that which we can never replace. To replant the forests may be costly, but it is comparatively easily done, but to replace an exterminated race is beyond our powers, at any rate up to the present. Synthetic labour has still to come; its arrival, I fear, will not be just yet.

The subject is a weighty one, but the opinion of the authority who writes our Foreword is equal to it. And as our former Ambassador to the United States wrote when returning the proof, "The development of the Tropics is a vast subject, momentous for the world." Surely, therefore, in these days of strife and strenuous action, we are not going to allow the pearl of all the Tropics to dissolve in the vinegar of our inhumanity because it is no one's business to pull it from the glass whilst still whole and sound.

Regarding the book generally, it was originally my intention to have collaborated with Mr. Woodroffe in writing it, but fate decreed otherwise. At that time a state of affairs reigned in Europe very different to that which exists to-day (June 1st), and since we first discussed the make-up of the book and what should and what should not be included between its covers, a great deal has happened, causing it to be necessary to alter our plans and to rewrite much of Mr. Woodroffe's original MS., which was completed before the outbreak of hostilities. Since then, owing to delays in the post and, in some cases, to letters having been returned by the authorities, I feel that certain sections are still far from perfect. Financial troubles also in Brazil caused my friends there to be much keener on looking after their own affairs rather than those of the Republic generally, or on getting out of the country before the fall in the exchange ruined them altogether. What it cost one man, first in milreis and then in sterling, to reach home, I dare not say, so substantial was the sum. It can easily be understood, however, what disadvantages and impediments suddenly sprang up around me when I settled down to do my share of the work, especially as Mr. Woodroffe, quite unintentionally, dealt me the worst blow by being among the first to do his duty by enlisting. We have, therefore, been unable to complete his notes and follow out to a final conclusion certain lines of argument regarding costs, the best means for opening up the Amazonian lands for cultivation, and settling the *seringueiros* and others, each on his own homestead, and, above all, as to the pros and cons of an extensive scheme of Chinese and Japanese immigration into Brazil, &c., as he intended to have done had he been free. Many of the missing particulars are now unobtainable, and will be for many months after the war is over. This being so, Mr. Woodroffe wrote placing his notes in my hands to

build up the book as best I could on my own lines, basing my opinions as to the deductions to be drawn on his experiences and observations made on the spot (often at the cost of much inconvenience and even actual suffering), coupled with my own knowledge and views of Latin America and her people. For this reason the book has been "put up" in rather a peculiar manner, for which I apologize; a paragraph or entire section of my own being suddenly introduced in the midst of what my fellow-author had to say, whilst any faults in the "summings-up" must be debited to me alone. Where I have written the whole of a chapter, a note to that effect appears in the "Synopsis of Contents" under the heading of such chapters, whilst elsewhere, whenever I could do so unobtrusively by means of brackets, I have shown where my statements or views have been "sandwiched in" between the various sentences of the author's narrative or reports.

I hope those who set out to study the following pages will realize that they have not been written to arouse or to increase the spirit of rivalry or competition between Brazil and the East, but only, on the contrary, to suggest how the two producing centres can work in harmony, and instead of weakening each other, owing to a trade war between them, how they can arrange to come to a mutual agreement regarding outputs and markets.

At the same time, there is no denying the fact that to-day the Brazilian rubber industry is in a bad way, since even so friendly a critic as Mr. Akers (the news of whose death unfortunately comes to hand as I revise these notes) says so, and says so plainly, in his book on "The Rubber Industry" (p. 291), when he tells us that: "The dominant factor in the rubber situation from now onwards will be undoubtedly the returns from plantations, and the supplies from wild sources will steadily recede into the background."

That production in the Amazon Valley should cease altogether is by no means a corollary of the conditions now in process of development; the general indications are that Brazilian and African wild rubbers will continue to come forward, but the shipments will be smaller in quantity and principally confined to the higher grades. While this reduced output may retain a premium in value for some years to come over the Orient product (for reasons afterwards explained by Mr. Akers), its importance as a factor influencing market prices will decline in direct proportion to the progress of the plantation industry."

If these words (coming as they do, not from the chairman of an Eastern plantation company, but from the Chief of the Commission appointed in 1911-1912 to study the conditions of the rubber industry, both in the East as well as in the West, and which gave us the now well-known "Akers's Report") do not make Brazil start at once to put her house in order, then that Republic, left to herself, is beyond hope; but what about her foreign bondholders and other creditors, will they be content to merely look on until, as Mr. Akers puts it a few lines beyond where we stopped quoting him, Brazilian rubber "will become a luxury instead of a necessity"? Surely not. At the same time, there is no doubt, especially as the East is already over-planted, that it will never pay Brazil to start planting in competition with her, but it may and should pay Brazil to spend the money (£25 or £250 an acre, whichever is true as regards Eastern costs) that it would cost her to clear, cultivate, and plant up her lands, to slowly but surely clean, ditch, and drain her river banks and uplands, and clear and drain back her rank forest growth in the Amazon Valley. Doing so will not only render available those millions of, as yet, untapped trees, but conditions of health and sanitation, of pests and dangers to rubber trees and men alike, will be improved out of exist-

ence, whilst vast areas will become available for the raising of crops and the rearing of cattle, pigs, poultry, &c., to a degree that seems impossible at the moment—in a word, as Wileman so aptly puts it, such work would help “to so stimulate internal development that when the War finishes Brazil will be on the way to attain a position to supply consuming markets with what they require,” instead of the *seringuero*, as in the past, buying all he needs from outsiders at extortionate and trade-killing rates. All this will not be done in ten or perhaps even in a hundred years; but if a start is made at once, enough and more than enough can easily be done to improve the health and pockets of the *seringueiros* and *vaqueros* of the Amazon Valley in the near future, and in doing that to stem and turn the downward flow of the prosperity of the Amazon rubber industry and make the article still continue to be a stern necessity for all time and never merely a luxury, as Akers foretells may be the case.

There are those who are always harping on making Brazil, and even the Amazonas Valley, a manufacturing centre. This will come in due course, but its time is not yet, for, as the Hon. W. P. Schreiner, K.C., now High Commissioner in London for the Union of South Africa (and brother of Miss Olive Schreiner, the gifted authoress of “An African Farm” and other books), told myself and others at a meeting of the African Society,* held on February 12th, the cost of living out in Africa (and also in Brazil) is still, and will be for some time, too high to allow manufactures

* Talking of this meeting reminds me of the satisfaction I experienced at it when Mr. Wilson Fox, a prominent adviser of the British South Africa Co., in the remarks he made, dwelt upon the importance of the native population to South Africa both as producers of the food-stuffs that were so necessary, and also (with the money obtained from the sale of their crops) because of the enormous demand in the aggregate that the combined purchasing powers of these otherwise insignifi-

to flourish. When South Africa (or Brazil) can feed itself and have foodstuffs to spare for export, then, and not until then, will the cost of living, and hence wages, be low enough for South Africa (or Brazil) to start talking of setting up factories to compete against Europe and America. These facts, however, should only offer further incentives to a pushing people to be up and doing and (repeating Wileman's plea) to so stimulate internal development that their country will be in a position to export. As it is, times are hard, and not only in Brazil; worse still, they will become harder and continue in that undesirable direction until the world's supply of foodstuffs is placed on a more reliable equality with its demand than is the case at present. Our attention is called further on to what is already happening in Japan on this account, and that is but one of many instances; whilst the world's leading economists cheerfully assure us that serious as the case is to-day, for the poor races, like the East and West Indian tribes, it will become worse later on when the markets of Europe, Asia, Africa, and America will also be crying out for more food.

Knowing and believing this to be true is why I have so warmly advocated that those who can and will control the destinies of Brazil, and especially of the Valley of the Amazon, in a beneficial manner, from Pará to Peru, must do their utmost to lay down all the land they can under crops and pasture, and so first teach the people to feed themselves, and then to go on producing more and more until they can export their surplus supplies to feed others as well.

cant units called into being for British and other trade goods. If this is true of Africa, so should it be of Brazil to a far greater extent than is the case at present. Think, therefore, of what Brazil will become as a buyer of our manufactured goods when her population is increased and her rubber and agricultural resources properly organized.

Further reasons that should prompt this country to take an interest, and, I trust, a strongly compelling interest, in the future prosperity of Brazil are far from being purely philanthropic, nor are they based entirely on goodwill to the natives. In helping to improve their lot we shall benefit ourselves, for it must be remembered that if we can develop and extend such fresh channels of trade as I am about to suggest, and secure them for ourselves, we shall prevent them from going begging to our rivals and being snapped up by them.

It will certainly be most necessary, directly the War is over, for all the nations, friends and foes alike, to be up and doing in order not only to repay the savings and reserve funds that we had laid by and which must be replaced for future emergencies, but also to enable the nations the more quickly to liquidate the costs of the outbreak, that must, under the most favourable circumstances, continue to weigh them down for some years to come. In a paper he read at the Society of Arts before the Statistical Society, Mr. Edgar Crammond estimated the annual cost of the War to the six leading nations engaged in it as being about £9,147,000,000, made up of £4,870,900,000 for Great Britain and her Allies, and £4,277,000,000 for Germany and Austria, as follows:—

Austria	...	£1,502,000,000	France	...	£1,686,000,000
Belgium	...	£526,000,000	Germany	...	£2,775,000,000
British Empire	...	£1,258,000,000	Russia	...	£1,400,000,000

Furthermore, as will be noticed, the above does not include the losses and increased expenses of Japan, Serbia, and Turkey, as well as of the neutral Powers, and this latter item alone is certain to amount, we are told, to a staggering amount. For these reasons it would, therefore, be as foolish for this country and her Allies, especially France, to let such a chance pass them by as Brazil will offer directly the War is over, to open up and develop fresh markets for manufactured goods from this side in exchange for a

multiplicity of their products (and not only two or three as at present), as it would be to-day for the Allies to "go slack" in the trenches in Western Europe and so allow the Germans to enter Paris. If we do not seize the excellent opportunity that will be ours later on of entering into and permanently securing the import and export markets of Brazil, which our far greater wealth and powers of recuperation will render more easy for ourselves than for others, we shall soon see the position occupied by our competitors, and once they do get in again it will be practically impossible to dislodge them. Taking England alone, every £1,000,000,000 that the War adds to our National Debt will involve an annual addition of £40,000,000 to our taxation, and it will need a vast expansion in our world-trade to enable us to bring in the fresh business necessary to include this annual charge in our future normal budgets, which, we are told, will amount to £300,000,000 a year. This sum, gigantic as it may be, must be liquidated not out of borrowed money (as Brazil too often has done), nor, let us hope, out of capital, but out of those *increased* profits that we must and will make in order that the debt may not strain our normal resources. This is an important reason why we should take an active interest in the development of Brazil and her trade, and the sooner we make a start, the better.

If we are to derive advantages from extending our interest in Brazil and her commerce, especially that connected with the Amazon Valley and its seaports, these centres of trade also stand to benefit enormously by our help, far more than we shall by theirs. I say this on account of the following note, which appeared in the *London Times* as recently as April 19th last, wherein we are told that the "belated report of the Port of Pará for the year 1913 is completely dwarfed in interest by the Company's later developments. The financial and commercial depression that had then already

set in has since made considerable progress, the price of Pará rubber has undergone a further fall, exports and imports have continued to decline, and, to make matters worse, the difficulties of the Federal Government have necessitated the issue of paper money with a heavy fall in the value of the paper milreis. The tardiness of the Government's payments of guaranteed interest to the Company has added to the latter's embarrassments. The payment for 1913 was not made until March 3rd, 1915, and then in gold Treasury bills instead of in gold, and that for the first half of 1914, amounting to £202,500, cannot be paid, although it has been approved, until it has been registered by the Tribunal de Contas. These non-payments led to the Company's default on both its First and Second Division Five per Cent. bonds, chiefly because a very serious loss would have been involved if the Treasury bills had been converted into cash in the existing circumstances. In view of the serious position the trustees of both bond issues have sent representatives to Brazil to fully investigate and advise, and meanwhile the Company has suspended all but absolutely necessary expenditure and has effected important economies. Further trouble has been caused through the Madeira-Mamoré Railway Company, in which the Port of Pará Company is largely interested, being unable to meet its obligations last year as a result of the inability of the Federal Treasury to repay the expenditure on the construction of the line. These recent events make the 1913 accounts comparatively uninteresting, and all that need be said is that after payment of bond interest and sinking fund they showed a paper surplus of \$370,181."

So much for our interests in Brazil and out West, but even in the East our ally Japan apparently needs assistance, for, as the *Daily Telegraph* of April 21st pointed out, the recent meetings of the plenipotentiaries have proved conclusively the futility of Japan hoping to win her own way

in face of the growing publicity and the growing agitation which her attempts to annex the British Yangtze Valley concessions are exciting. Everyone is asking how it is possible for a Power to have such pretensions when financially she is unable to build 100 miles of railways in China without going to some foreign market to demand rights and privileges necessitating £10,000,000. Thus, the railways concessions granted to Japan two years ago in Eastern and inner Mongolia have been indefinitely hung up, and years may elapse before any European market is willing to finance them.

As I believe it will suit our interests to have Japan, in preference to a European competitor, to work with in China, it seems possible that if we can help the Japs to advantageously dispose of a portion of their surplus population along the Amazon Valley and elsewhere in Brazil, we should also assist them, in time, to increase the national wealth of Japan and thus enable her to obtain the money to finance the railways necessary for the opening up and economic development of China. All this may, at first sight, appear to be outside the scope of this book, but I do not think so. The more we can help Brazil to develop her resources, the better for ourselves; but Brazil, so I maintain, cannot be developed without the Japs and the Chinese, and therefore the best way we can help the English taxpayer to meet his coming £300,000,000 budget without inconvenience is to work in collaboration with the Chinese and Japs, both in the East as well as in the West, and thereby secure a firmer grip on the fresh channels of international trade that will be called into being in each of these important centres of commerce, and divert as much as we can of it towards our own factories and counting-houses.

Thus summarizing all that has been said in the pages to come, we have suggested that, if Brazil is to maintain

her supremacy as a leading country of the world and as a producer and exporter of raw rubber, she must do as follows, besides many other things:—

(1) Freely encourage the immigration of a class of people like the Chinese and Japanese agriculturists and smaller tradespeople (not the scum of the towns), who have sufficient enterprise and initiative to help Brazil help herself, and who will be willing to interbreed and settle down with the half-breeds and pure Indians at present in occupation of the bulk of the rubber lands.

(2) With this increased population to develop new industries, especially those connected with the homestead or farm, and through that to make living far healthier and cheaper and so reduce the cost of production of the rubber she exports. This will in time make the rubber collecting distinctly a secondary industry to the family, and not its sole means of support, as at present.

(3) To open up the forest areas, utilizing the timbers, gums, resins, drugs, &c., to be found there; at the same time, so far as is possible, to drain and clear the ground of pests, possibly introducing pigs and allowing them to go wild to help keep down the snakes. In this way the 300,000,000 trees said to be there still untapped would become available and their output of rubber could be used to defray the cost of making the huge area to be opened up, fertile and healthy, instead of a serious danger and a hopeless "dead-head" as it is at present.

(4) Far from any idea of working in opposition to the East, Brazil must make up her mind to work in co-operation with her, especially when supply tends to outstrip demand and a restriction of the output is necessary. Whether representatives of the manufacturers will also be included in the advisory committees appointed to regulate the output remains to be seen.

(5) That whatever is done, the start must be made soon; the sooner the better for everyone.

Since I started this introduction, after completing the book, I received a letter from Mr. W. A. Graham, who acts as Adviser to the Minister of Agriculture at Bangkok, Siam, in which he was good enough to comment (quite unofficially, of course) on various points I had raised in a letter I addressed to him when I enclosed a copy of the first section of this book dealing with the labour supply. I now include his remarks as offering a useful and reliable opinion on my suggestions, rather than delete the word "Siamese" as he suggests, and so lose the excuse for adding the valuable information that Mr. Graham gives regarding Siam and her population, and of the possibility of substituting Malays for Siamese as emigrants to Brazil if their religious scruples do not interfere with the connubial relations between them and the Indian women that I propose. Personally, a race springing from the union of Malays and South American Indians does not appeal to me as likely to be either tractable or industrious, but one rather that might become a somewhat disturbing element. In this, however, I may be entirely wrong, and so leave it to others to say whether such a blend would be good or bad.

"On the fifth sheet" (see p. 11 of this book) Mr. Graham wrote, "occur the words 'or, better still, the Japanese, Chinese, Siamese, and others should be introduced,' and you then ask my opinion as to the prospects of importing Siamese into Brazil as colonists.

"My opinion is that the word 'Siamese' should be deleted from your proof, as it is not in the least likely that any Siamese can be induced by any means whatever to leave their country for the purpose of colonizing Brazil or anywhere else. Siam is a country capable of supporting with ease a population of from thirty to forty millions, but having

actually only a population of under seven millions. Consequently life is easy, and can be comfortably maintained with the minimum amount of work. Beyond cultivating paddy, the operations connected with which occupy some three or four months of each year at the outside, the Siamese do not work, all local manufactures and trades being in the hands of Chinese immigrants.

“As are the Siamese, so are all the other races of Further India, and none offer any possibilities as colonists except perhaps the Malays. These last, owing to their wandering habits, to the over-population of parts of their country, and probably to peculiarities of the administration of British Malaya, sometimes prefer to leave their country, and as of course you know, have formed colonies in South Africa, Florida, and elsewhere. A certain number of Malays might possibly be induced to settle in Brazil, but their religious scruples might interfere with the connubial relations which you seem anxious to see established between the colonists and the women of the country.”

It is, in some ways, a pity that the Siamese are unlikely to be spared to go to Brazil, for they have had some experience both with rubber and coconut planting, as Mr. Graham points out in another part of his letter, where he goes on to say: “Several kinds of wild rubber grow in Siam, and when prices ruled high a certain amount was exported. But Hevea does not do well here, except in the southern districts, which extend down the Malay Peninsula. In the latter locality a few thousand acres have been planted, but at this moment there is only one small plantation producing. There is, however, considerable scope for coconut planting in Siam, and the Government is doing what it can to promote this form of agriculture. In this connection we have derived considerable benefit from your book, ‘Coco-nuts: The Consols of the East,’ which I trust you

will permit me to say I consider to be a most excellent work from every point of view."

∴ As to there being room in the world for both East and West, of this there can be and must be no doubt; for whilst it is unthinkable that the plantation rubber industry should go to the wall, it is equally impossible that this country will allow her investments in Brazil, amounting to some £350,000,000, to be placed in jeopardy to avoid any chance of about £70,000,000, or just one-fifth that amount, proving unremunerative "out East," especially as Brazil, with all deference to Malaya and Ceylon, offers future possibilities for trade, import and export, with this country and her overseas Dominions, compared to which the capital value, even of the whole of the rubber estates in the East, is comparatively insignificant—or it should be if we make the most of the opportunities that fortune will hold out for us to seize during the next fifty or one hundred years, as I hope and believe we shall.

For these reasons I agree with Wileman, in the *Brazilian Review*, when he claimed some time back that, given a "Morgan" in finance at Rio, the Republic can carry all before her, whilst, as regards her rubber industry, the same authority goes on to say: "It is senseless to imagine that with consumption growing at the rate it is, the world can do without wild rubber—the best so far extant. At the moment immediate prospects are not rosy, but we are just now in a transition stage between over- and under-production, such as coffee went through when, in consequence of over-production, prices sank below production level."

Speaking on the same matter as to the survival of the fittest centre and the disappearance of the second-best, Mr. Heath Clark, Chairman of Messrs. Harrisons and Crosfields, Ltd. (of which concern Mr. Arthur Lampard is a director), made the following remarks last October, in his speech to the

shareholders at the sixth ordinary general meeting of the company; and as Mr. Clark is a very experienced, far-sighted, and level-headed man of business, considerable importance can be attached to his words, which were:—

“It is very probable that the collection of wild rubber may continue to fall off to a very much greater extent, owing to the difficulty of finance, than would have been the case if it were a question alone of comparatively low prices.

“I might remark in this connection that I was looking at some figures this morning which show that the exports to this country from sources other than the Middle East have been reduced for the nine months of the present year, ending September, to the extent of nearly one-third. That, probably, is a fair indication of the effect which the low prices ruling have had on other sources of supply; and when to the low prices are added the difficulties of finance which will now have to be faced, I think there is very reasonable probability that we shall see a continued further decrease in the supplies from the other portions of the world that compete with us in the Middle East, and I think we may continue to feel confident that, whatever the temporary effects of the war may be on the rubber industry, it will continue to give us handsome returns on the large amount of capital invested in it.”

I sincerely hope, with Mr. Heath Clark, that the Eastern estates will continue to do well, and because I have the same good feelings for the Western centre as well, I have caused this book to be written to enable the Amazon to “go and do likewise,” otherwise the leading Latin American Republic (at any rate, as regards natural resources, developed, undeveloped, and even unknown and unrealized) will never be able to open out those new channels of trade which English merchants and manufacturers require, and without which Brazil cannot adequately feed and maintain her present

population (much less so the vastly increased one that I hope to see flock to her shores and river banks). Neither will she be able to meet the taxation at home, and the interest and sinking funds on those huge sums which she has borrowed from abroad so freely that those whom I believe to be her best friends expressed pleasure when they heard that, owing to the War, the loan last autumn was never floated.

Whatever the results prove to be, I think all will agree that both Mr. Woodroffe and myself have at least tried to get to the bottom of things and to do the task we set ourselves as thoroughly as possible. With all such books the trouble is not what to put in to fill up, but what one can leave out without spoiling our case. With an estimated population of all breeds of 22,515,000 Brazil owes this country alone £350,000,000, or, roughly speaking, £15 a head—man, woman, and child, white, red, black, and olive—and when one thinks of such a debt and such debtors, coupled with the cost of living in the Republic compared to the spending capacity of the bulk of the population, and with what the cost could be and should be, surely it is high time for this country (and others) to take an interest in the affairs of Brazil so as not only to secure the debt already owing, but to develop her powers of production, and so extend her possibilities of increased trade to a degree that would be impossible in any other country but Brazil, compared to what we are doing with her now, or did even a year ago, when the European War was not thought of.

All reports seem to agree that the lot of the majority of *seringueiros* is a harsh and unhealthy one; it need not be so, as anyone who will take the trouble to glance through the coming pages must surely agree, and as this harshness and unhealthiness, or rather the causes of them, are, in my opinion, the reason why the Brazilian rubber industry is inclined to go to the wall, why not try to check its down-

ward career along the lines suggested, or by other means? Sooner or later something will have to be done, so why not do that something "right now," for there is no time like the present, and there is much to discuss and arrange before any money will be needed? The Great War will be over before we can possibly need the money, so the want of that cannot be urged as an excuse for further delay. Whether the reforms can be conducted on lines similar to those suggested in this book remains to be seen, but if not, perhaps the very unsuitability of those now advanced will cause others to be substituted that are more practical and so enable a better start to be made, and that at an earlier date than now seems likely or possible. If this is the outcome of the book our object will have been achieved, and both Mr. Woodroffe and myself will be more than satisfied with the result of our labours.

It only remains for me to exonerate Mr. Woodroffe from any blame that may arise from the spelling or "make up," or even for the different sections introduced, as it was I who, at the beginning, drew up the programme to be followed, and arranged the order in which the book was to be put together; whilst as to the spelling and other mistakes, since my fellow-writer has not seen the proofs, it would not be right to fix the blame on him for any shortcomings. Some of the deductions I have made and the conclusions that I have arrived at may not even meet with his approval, but I have done my best, and these are somewhat disturbing times in which to write such a book as well as doing my regular journalistic work. As, however, I have long waited for someone else to do so, and waited in vain, I have done my best in the hopes of benefiting this country as well as Brazil, and no one can do more than that.

As far back as 1911 I was out on the warpath, for in October of that year I wrote making certain proposals on

the subject of the development of Brazil's natural resources to Dr. Pedro Toledo (among many others) when that gentleman occupied the position of Minister of Agriculture for the Republic, and in reply received the following letter, of which, I believe, the following is a fairly correct translation :—

“ Gabinete do Ministro da Agricultura

“ Industria e Commercio.

“ Rio, November 20th, 1911.

“ ILL. SR. H. HAMEL SMITH,—I have read your letter of October 20th, with its suggestions* regarding the Brazilian rubber industry; your ideas on the matter are, on the whole, well inspired and practical, even coinciding in certain points with those that I have adopted.

“ You will be aware that an International Chamber of Commerce has been established in Rio, which will have branches in all countries commercially related with Brazil, whose functions are more or less along the lines of the ideas contained in your letter.

“ This Chamber, with headquarters in Rio, and its affiliated branches abroad, will be made up of merchants, bankers, traders, &c., interested in the commerce of Brazil, who will take charge, in the interest of their fellow-members, of the above work, in which task they will not only have the moral support of this Ministry (*d'este Ministerio, i.e., of Agriculture*), but also such material assistance as may be necessary for their maintenance and development.

“ This Chamber will also look after the interests of those connected with the production and distribution of Brazilian produce, in which, of course, rubber figures prominently, and so far as this article is concerned, the action of the Chamber and its branches will be confined to carrying out

* The suggestions referred to were in no wise so elaborated as those now included in this book, and did not touch upon immigration or homestead settlement schemes.

the vast plan contained in the pamphlet enclosed herewith. As you will see, this question has met with my special attention, and is being solved in a thorough and rational manner.

"We may, however, find it advantageous to create in London, as well as in other great cities, committees or associations of a purely private character which will be exclusively devoted to encouraging the production of and commerce in Brazilian rubber. The idea which in this respect you have advanced will, I hope, be put into execution after being duly studied.* Should you care to continue this idea, it would be best for you to define or explain your plan with the necessary details.

"Com subido apreço.

"(Signed) PEDRO DE TOLEDO,

"Ministro da Agricultura."

Other work, and especially the preparation, first of my book on the "Coco-nut," and then that on the "Fermentation of Cacao, &c.," prevented my elaborating the plan of campaign, as Dr. Toledo kindly suggested that I should do, and later, when I was ready, I learnt that a new Minister of Agriculture reigned in Dr. Toledo's place, and as just then I had the pleasure of meeting Mr. Woodroffe, I decided to put my ideas, joined with his, into a book, and leave wiser heads than mine to decide which of my ideas were feasible and good and which impracticable and useless—and here is the book.

* This, as already stated, arose, I believe, out of the wishes of Mr. Reginald Enock and myself to see an institution established in London on the lines of the Pan-American Union at Washington, to encourage intercourse and trade between leading Latin Americans and the merchants on this side, as explained in the last section of this book, p. 387, where I reproduce my correspondence with Mr. (now Viscount) Bryce on the subject. Unfortunately, I have mislaid the copy of my letter to Dr. Toledo, and up to the time of going to press have not come across it again. I can only find the original letter that he sent me.

I was anxious to obtain a definition of "the law of the '44" (see p. 136), but it was not easy to get a letter through to Mr. Woodroffe (now Quartermaster-Sergeant, Headquarters of the 43rd Light Infantry Brigade, British Expeditionary Force, "somewhere in France"). At last, however, I managed to trace his whereabouts and get a letter to him, which brought the following reply: "I am greatly indebted to you for taking charge of the book, as I positively have not had one instant to spare on literary work. The law of the '44 is the law of the rifle, *i.e.*, it represents that state of politics, &c., governed by those who know how to use with the greatest rapidity, to most effect and at the least possible excuse, the Winchester rifle, calibre '44."

I have one more duty to perform, and that is, to thank my fellow-authors and their publishers for so kindly lending me their blocks to show types of the Indians and also of the forest growths, &c., that I suggest, rather cavalierly, you may say, can be cleared and the land utilized. I propose, however, to do nothing which has not already been done, and all we now want, with the huge areas to be cleared, is to have plenty of people to help in the work. I am indebted to Messrs. G. P. Putnam's Sons, of New York and London, the publishers of Mr. Algot Lange's books, for the block of the interior of a *seringuero's* house (facing p. 96) and the one (facing p. 268) of the woman crossing the *ygāpo* or creek. I was very glad to have these to show the class of forest growth that I hope, in time, to see improved out of existence. My old friends, Messrs. David Bridge and Co., Ltd., the rubber machinery engineers of Castleton, Manchester, with whom I have worked out many a knotty question *re* the drying of tropical produce and the preparation of rubber for export, have, as can be seen by glancing through the book, placed many of their blocks at my disposal. The photo of Mr. H. A. Wickham, the father of the Eastern

plantation industry (facing p. 32), I have borrowed from his book* telling us how he brought the first seeds to Europe in 1876 from the Tapajoz Plateau up the Amazon. To my own publishers, Messrs. Bale, Ltd., I am indebted for the seven blocks from their book, "Life and Adventure in the West Indies," by "Vaquero," and also for the two cartoons (facing pp. 10 and 11) out of *Tropical Life*, one of their many publications dealing with the Tropics and tropical work. Three blocks have been reproduced from the *Pan-American Bulletin* and two from the *British Guiana Handbook*, published by the Argosy Co., Ltd., of Georgetown, British Guiana. These latter appeal to me as being particularly interesting, especially the one of the Patamona Indians, facing p. 20, as showing the healthy physique and pleasing faces of those Indians who have not been badly treated. Comment may be made that many of the illustrations are of views outside Brazil, but surely this is as it should be. There is no need to show Brazil as she is, but as her, at present, more backward districts should be and could be, given the necessary population, care, and attention that I hope and believe they will receive, and that before many more years have rolled by.

HAROLD HAMEL SMITH.

London,

June 1st, 1915.

* "The Cultivation and Curing of Pará Rubber," by H. A. Wickham.

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THE RUBBER INDUSTRY OF THE AMAZON

And How its Supremacy can be Maintained.

CHAPTER I.

THE LABOUR QUESTION.

By THE EDITOR.

USE THE INDIGENOUS STOCK TO BREED FROM, AND IN DOING SO
IMPROVE THE CLASS OF MAN AND WOMAN YOU REQUIRE
AS ORDINARY LABOURERS, PEASANT PROPRIETORS, &C.

THOSE who wish to talk about rubber only will perhaps want to skip this section; it would, however, be a pity to do so, for the greatest success on earth is like a beautiful building which, to be well made, must have carefully joined and thoroughly seasoned foundations. These are, as a rule, buried away perhaps from sight, but for that very reason it is all the more necessary to make them safe and sure, otherwise rot and dust creep in, and no one knows of it until perhaps it is too late to prevent serious damage to the structure: and as it would be with such a building, so it must be with any scheme of foundations for a great and prosperous Brazil; especially as in this case the foundations are the labourers to work the land and so set in motion the

wheel of fortune and trade. At present the raw materials for this work are very defective; let us therefore see if we cannot take what is good in them—and good there is, since no one is wholly bad—and, by welding and grafting the good qualities of others on to what we have, thereby form a well-seasoned and acclimatized material on which we need not fear to raise the most substantial and capacious building, entitled “New Brazil,” large and wealthy enough to attract and house men and women with energy and enterprise from all parts of the world worthy to enter therein.

In this democratic age, therefore, I may be pardoned if I start at the lowest rung of the social ladder, viz., on the native Indian within Brazil's gates, sturdier and with more stamina than the average *Caboclo*, firmly convinced that through him we can, with far greater justice and also more easily and quickly, help the economic development of the Republic to mount to higher things, and in the ascent, by assuring the comfort and well-being of those in the lower strata of society, gain greater confidence from those to whom we shall have to look to develop the financial, mineral and industrial, as well as the commercial and agricultural resources of the Republic.

If Brazil, or those who are trying to place her finances on a permanently sound basis, that will last for all time, make the mistake either of ignoring the Indians, or worse still, of trying to kill them out by violent means, by neglect or misery, they can never secure the class of well-seasoned and thoroughly acclimatized labour that they need; and will, furthermore, for several generations to come, have in their midst a festering wound, liable to break out at any time, in the most unaccountable and unexpected manner, that will discourage many and frighten everyone, and so put back the clock a hundred years or more; and it is within this next hundred years that I hope and believe

Brazil will do so much. I pen these lines as the trains in the distance are firing fog-signals to bid farewell to the old year, and whistling noisily to welcome in the new one.—young 1915—and so, in Brazil, may the year 2015, in its turn, be whistled in, with that country as rich and prosperous as this old London is to-day, and able, if the need arises, to bid defiance to those around her who threaten her happiness and the peace and goodwill of the world, as London, the hub of our Empire, is now doing.

And so since to-day, apart from any consideration of humanity, both England and America, nationally and individually, profess to attach paramount importance to the liberty and welfare of the subject down to the members of the criminal and depressed or pariah classes as in India, or the international scum in New York and Chicago, let us avoid the rock against which so many a pioneer scheme has come to grief in the past through ignoring or killing out the indigenous and acclimatized race and trying to introduce an alien and unacclimatized element in its place, instead of trying to intermix the two and through them to evolve an improved breed in many ways. Both with men and with cattle, attempts have been made, I believe, to rely entirely on the imported stock, with the result that such experiments have failed every time. What must be done, therefore, is to coax the wild men into the open; place proved white men, preferably European or North American, in charge, open up the country into homestead or village lots, and give the land to the Indians (and to no one else) as their own, to till and to tend, and when their supplies of vegetables, poultry, &c., exceed the local demand, then they can sell their produce to the *seringueros* and others, still under reliable white supervision, to avoid the Indians being cheated or imposed upon, and so slowly develop agricultural industries of their own. In no case must a race other than the

Indians, or their children, be allowed to own such land, and any attempts at purchasing it, or of alienating it on the part of others, would mean immediate confiscation and reversion to the Government. With such precautions, and given the right men in charge, Brazil can look to having a million really useful people in fifty years' time, and at least three millions in a century hence. By then, seeing the example set by this half-Indian class, it is not impossible that the wildest and more irreconcilable tribes will, in their turn, have become leavened, and, as the Salvation Army and other social reformers are trying to do in India,* the Japanese in Formosa, and the Americans in the Philippine Islands, these natives may, when they find that they get more to eat and less work to do by organized labour, also agree to come into the pale instead of remaining out in the wild. It is Nature's way all through and was faithfully and graphically portrayed by Jack London in "White Fang," three-quarters wolf and one quarter dog, when his mother Kiche refused to go back to the wild, preferring civilization (such as it was there), with its discipline and cruel blows, but with the warmth and regular food, to the uncertainty of existence outside, harassed by other animals and threatened by hunger. Let us, therefore, for a moment, discuss the raw material, and try to ascertain which tribes might be utilized as a beginning. First, however, let me say that since I completed this section (not before), I remembered the series of articles that Colonel Roosevelt had been contributing to the London *Daily Telegraph*, and so referred to the file to see what he had to say on the subject. These articles started early in 1914, but, owing to the war, stopped

* See, as one instance, the memorandum dated July 11th, 1914, drawn up by Commissioner Booth-Tucker, the Special Commissioner in charge of the Salvation Army work in India and Ceylon, relating to a proposal for supplying labour to the tea gardens, &c., from the criminal tribes in India. *The Indian Planters' Gazette*, of Calcutta, discusses the matter fully in their issue of January 6th. 1915. p. 28 &c

for about five months until they commenced again, I think, on or about December 26th (1914), and in this last batch, between that date and January 2nd (1915), I have made the following notes to help confirm my statements and to show that what I would like to see done is not unreasonable, much less impossible.

First, with regard to the treatment of the Indians, the ex-President wrote as follows on December 26th (at least that was when the article was published), when discussing the Rio Sepotuba or River of Tapirs: "The country along this river is a fine natural cattle country, and some day it will surely see a great development. It was opened and developed by Colonel Rondon only five or six years ago. Already an occasional cattle ranch is to be found along the banks. Colonel Rondon is not merely an explorer, he has been, and is now, a leader in the movement for the vital betterment of his people, the people of Matto Grosso. The poorer people of the back country everywhere suffer because of the harsh and improper laws of debt. In practice these laws have resulted in establishing a system of peonage.* A radical change is needed in the matter, and Colonel Rondon is fighting for the change. As head of the Indian Service of Brazil, which corresponds roughly with our (*i.e.*, North American) Commissioner of Indian Affairs, he is also taking the exact view that is taken in the United States by the staunchest and wisest friends of the Indians. . . . The Indians must be treated with intelligence and sympathetic understanding, no less than with justice and firmness . . . they must be wards of the nation, and not of any private association, lay or clerical, no matter how well meaning."

Elsewhere Colonel Roosevelt, when speaking of the same

* As Mr. Woodroffe found out to his cost, having been himself placed in that condition, which he described as "a hell." See his book, "The House of Peonage of the . . ."

man, tells us (see *Daily Telegraph*, December 30th, 1914), when discussing the two Parécis Indians he met in the Brazilian Highlands working for the Telegraph Commission, of how "Colonel Rondon, by just, kindly and understanding treatment of these Indians, who previously had often been exploited and maltreated by rubber gatherers, had made them the loyal friends of the Government. He had gathered them at the telegraph stations, where they cultivated fields of mandioca, beans, potatoes, maize, and other vegetables, and where he is introducing them to stock-raising, whilst the entire work of guarding and patrolling the telegraph line is theirs."

Now this is exactly what I want to see done with the Indians in Brazil. I have been told, time and again, that it was impossible; here is a proof that it is not so. The outlay for buildings is not great, for Nature provides the materials. Colonel Roosevelt describes one of the plaited palm houses that we all know so well, and find so comfortable in the Tropics, once the walls are swept down and kept clear of insects. "The houses of the smaller fazendeiras were of palm leaves, even the walls being made of the huge fronds or leafy branches of the Wawasa palm stuck upright in the ground and their blades interplaited." To this I would add that such houses cost little, except time, skill and labour to erect, and still less to keep clean and in repair. Screens of the same interplaited palm leaves should be placed on the offside of a fairly wide verandah, or under the extending roof on the weathered side when it is stormy, as they help to keep the wet out, or on the sunny side when the heat of the day is on to keep it cool. The materials for such screens, as well as for the whole house, are there for the asking, but many of these folks, especially those with more white blood in their veins, are inclined to be very slack with repairs. They seem more inclined to live

in the house until it almost falls about their ears, and then to build a new one, than to keep the original one in repair as the leaves or the uprights rot and need replacing. This is a little slackness that no doubt example and precept can, in time, improve out of existence.

These articles in the London *Daily Telegraph* or Colonel Roosevelt's book, now it has appeared,* cannot be too carefully studied by those who want up-to-date information about the little-known areas of South America. So far as I can remember, the expedition sailed or steamed up the Paraguay River from Asuncion to Cromba, thence along the upper waters of the Paraguay and the San Lourenço until they reached Cayaba and Caceres on the extreme edge of the settled regions of the State of Matto Grosso. After that they went up the River Sepotuba or River of Tapirs, and finally, before emerging by way of the rubber ports along the Amazon, Colonel Roosevelt and his party traversed the Rio Duivata or Duvida (the River of Doubt),† of which we have heard so much. Such a journey covered an immense area, in which much settlement work could be, and in fact must be, done to develop those channels of trade, by means of the commercial, agriculture and mining industries, which will in the end make Brazil one of the richest countries in the world. I do not care to speak of Indians and mining in the same breath, but as regards the raising of vegetables, cereals and other foodstuffs and the rearing of cattle, what Colonel Rondon has started around his telegraph stations can be, and should be, done elsewhere, and the sooner the start is made the better for everyone.

Progress must be slow; probably it will be necessary,

* "Through the Brazilian Wilderness." By Theodore Roosevelt. With illustrations from photographs by Kermit Roosevelt and other members of the Expedition. Medium 8vo. 18s. net. London: John Murray. New York: Charles Scribner's Sons.

† Now, I understand, to be called Rio Theodoro, after the Colonel.

after the Indians have been enticed from the forests and settled on the land, to allow them time to become accustomed to the Asiatics and remove any prejudice they may have (and as the Mexican Indian women, when forced to cohabit with Chinamen, very naturally showed) by becoming familiar with the imported Japanese, and especially the Chinese. If Lil, Sue, and Tilda, the white girls in America, go with Chinamen willingly, even preferring them to Americans and Europeans, because the Chinese, so long as their jealousy is not aroused, are kinder, more evenly liberal, and take more care of them, surely the Indian women and girls up in the horrible depths of the Brazilian wilds will not find them too repugnant as mates, but will also be willing to pair off with them. Allowing for all this, one must not, therefore, expect to do anything much in five or ten years, beyond getting the Asiatics into Brazil, settling them on the land, and then, probably with their help, persuading the Indians to take up land also. As with re-forestation, one must be content to-day to work for a future generation, fifty, a hundred, or a hundred and fifty years ahead, but someone has to make a start, so let it be this generation, and let it be made now.

The same as with cattle in Argentina, Brazil, Africa, and elsewhere, the indigenous, and therefore thoroughly acclimatized, breed of cattle is used as the stock on which to interbreed with the imported animals of a superior strain to improve their build and increase their size (since success cannot be achieved without both kinds), so the native Indians in Brazil and along the Amazon Valley, once their confidence is gained and force is not used in any way, should be willing in time to interbreed with the Asiatics, and between them develop a mixed race possessing the hardiness of the Indian with the stolidness, stability of character, and the business capacity of the Asiatic.

“The Indians of the Amazon Valley in general are docile

and have good manners," says Mr. Reginald Enock, who knows the district and indeed the whole of South America as intimately as anyone and better than most; "they are naturally free from immorality and disease; they have a strong affection for their women and children and a regard for the aged. They are well worthy of preservation and might have been a valuable asset to the region."

"It is interesting to note," he points out on p. 21 of the introduction he contributed to Hardenburg's "Putumayo," "that the 'Mongolian' resemblance to the Huitotos Indian of the Putumayo is again observed in a recently published report. The resemblance between the aboriginals of the Andean and Amazon regions of South America and Asiatics is striking, as indeed it is with the natives in some parts of Mexico." In Mexico, of course, the other day they dug up the perfect statuette of a Chinese mandarin that it was agreed must have lain there hundreds of years, and was considered to undoubtedly point to the presence of Chinese in Mexico in former times. Enock also deals fairly fully with the matter in his "Secret of the Pacific," when he discusses the possible peopling of America by Tartar tribes in remote times. All this and similar evidence and facts confirm my opinion that with patience and tact Asiatics could again be introduced into Latin America, especially into Brazil, to the advantage of everyone, particularly of the Indians themselves, with whom the Asiatics could and would interbreed, and by their example and family ties would raise the standard of these, the lowest classes of Brazil. I honestly believe that such connections would do more than anything to stop the abominable traffic in and ill-use of Indian girls that seems to have been, and to still be, so rampant in the up-river country, if not elsewhere. If there is one thing more than another to rouse an Asiatic to wrath (at any rate, those I have come across), it is when a lively young spark starts to make love to his wife or

concubine, and in a Chinese household it is not always easy to say which is the mother and which are the daughters.

Again, I have always had my doubts as to how Asiatics would stand the damp heat of the forests, and Enock also touches on this (p. 27 in his introduction to "The Putumayo") as follows: "Due to the peculiar conditions of climate," he writes, "the great altitude in the one case and the humidity in the other, no European or Asiatic people can take the place of these people, whose work can only be accomplished by those who have paid Nature the homage of being born upon the soil and have become inured to its conditions throughout many generations." I can vouch for the truth of this, and it is on that account that I feel certain that nothing can be done in Brazil without the Indians, although the Indians alone cannot make the Republic prosperous. If it ever comes to a question of extermination, those whom I would like to see removed are the low-class half-breeds—that mixture of Moor, Goth, Semite, Vandal, Negro, and Indian, to couple Enock's description with my own—who exploit and ill-treat the Indians, killing them out, and making those who escape or survive, hate and detest anyone with a shade of white in their skins. It is this brutality which has raised up an enmity between white and red that should and would have never existed but for these monsters, until to-day no one seems to have a good word for the Indians. Those who really know them, however, will agree that much can be done with them with patience and knowledge; they are worthy of a better fate than has been theirs hitherto; so let us, Great Britain and America, start "right now" to ameliorate their lot.*

* This is further confirmed by a book just to hand, "The Lower Amazon," by Mr. Algot Lange, who also wrote "The Amazon Jungle." Geo. Putnam's Sons.

In all cases two points *must* be kept dangling before the eyes of everyone wishing to develop Brazil permanently along the best lines possible :—

(1) The native races, whether pure Indian, pure Negro, Cholo (half Negro, half Indian), Mestizo (white and Indian), Mulatto (white and Negro),* &c., must, in all cases, form the basis of society, the drawers of water and the hewers of wood, or in these days, the cultivators of the soil in modern Brazil. From these will spring the peasant proprietor and agricultural labourer, the rubber tapper, the planter of maize and other foodstuffs, both for himself and for others, and every chance must be given them to rise in the social scale by encouraging them to further effort, for it is extremely necessary for the success of our scheme to develop Brazil that they should do so.

(2) Large numbers of agriculturists must be imported from other countries, either to form colonies of their own, and perhaps occasionally to interbreed with the better-class women in class (1), or, better still, Japanese, Chinese, Siamese, and others should be introduced *under the personal direct charge* of men of good social and political standing of their own race (see Chapter IX *et seq.*) as protectors of immigrants, and who would be able to see that humane treatment and just laws are meted out to their charges, and that they, like the natives, are given every encouragement and inducement to make good. Not only would these Asiatics be of great use to open up and develop the country, plant rice and cereals (so badly needed), introduce new local industries and food supplies, but they should be given every inducement and encouragement to interbreed freely with the women

* Note Lange's terms :—

Caboclo = offspring of Indian and White.

Mulatto = „ Negro and White.

Cafuzo = „ Indian and Negro.

Mestitso or *Mameluco* = any mixture as above or otherwise.

from class (1), and all the children from such unions should be placed under the charge of the Asiatic protectors of immigrants and be treated in every way as their Mongol fathers, and not as Brazilian Indians; this is an important point, judging from the Putumayo report and other information to hand. Follow out a system like this for fifty or a hundred years, and even if only an average of 5,000 Asiatics were introduced each year, anyone can soon realize what a substantial and useful army of agricultural labourers, artisans, small peasant proprietors, large estate owners and merchants would arise from these and be added to the population of Brazil, which needs them so badly.

Possibly at the start, revolts may occur, and some of the new-comers, and even of the native Indians, may be attacked and killed by the Brazilian mixed breeds, who, too indolent and incapable of developing the country themselves, object to being sent to the wall by this improved race.

Mr. Lange, in "The Lower Amazon," includes a chapter on "Food, Health and Sanitation," in which he exposes a serious state of affairs regarding the conditions amidst which some even of the wealthy Paraneses live, and describes the undesirable and unhealthy food and insanitary conditions that they are content to put up with. Yet a large proportion of these same people include those who, unable to help Brazil themselves, despise and ignore the Indian and the impoverished *Caboclo* who could be of use. These immovables are, therefore, really enemies to their own country, as they oppose reform and advancement, possibly because their unhealthy life and food enfeeble their energies, and even their wish to change. A change, however, even in their case, could easily be made.

First of all (quoting Lange), the Northern Brazilian lacks punctuality and reliability; next, he lacks ability to organize

and to concentrate; again, he has an absolute indifference to progress and expansion. They are decidedly a sickly race. The almost universally poor state of the average Brazilian's bodily and mental health is caused by the three factors—climate, alimentation, and moral regime. . . . There is no human being who can constantly inhale vapour-laden air and remain well, no matter how acclimatized he is, if he does not adapt his regime to the circumstances surrounding him. If (in Pará) he would spend less on exterior decorations, such as fancy stucco scrolls and plaster angels, spend less on multi-coloured mosaic tiles, and outer walls of enamelled bricks, and, instead, install in the basement of his dwelling a modest hot-air furnace, then he would not only have hot water to wash himself in, but the heat at night would permeate the walls and floors, and in drying them eliminate the chill of dampness and its consequences.

Damp air and lands, bad and insufficient food; these are at the bottom of all Brazil's trouble. Reform or improve out of existence those who are content to tolerate these unnecessary evils, and you will at once be half-way to success with your task of the renaissance and rejuvenation of Brazil. But it is these same wealthier folks who keep you back. "The bureaucracy," Lange goes on to say, "together with 'the 400,' and the upper middle classes, form a barrier that opposes itself against trespassing by outsiders on their social plane."

Living mainly on borrowed money or funds obtained without persistent effort, they prevent these outsiders from extracting from the plains and the forests the riches that are there for the asking, as, "Hidden within and behind its forest walls there lies latent wealth in prodigious quantity, not to be picked up like nuggets in a gold-placer or by any get-rich-quick method, but by the usual process of commerce, by cultivating the soil, by developing lumbering,

by introducing improved labour conditions. Fortunes are to be found in the region, but it is hardly necessary to remark that they are not to be secured through speculative efforts in high finance, but through common sense, hard work, and strong will. . . . It is a fact which Brazilians do not like to admit, but is nevertheless true, that they themselves are, at present, unable to carry out any extensive construction scheme." Meanwhile Dawson, who, after being Secretary to the United States Legation at Rio, wrote an admirable book on the South American Republics, tells us that, "Rome gave to Portugal her law, language, religion, and architecture, and Portugal passed it on to Brazil." Thus Brazil of to-day can claim to be a nation which has inherited the civilization of ancient Rome, influenced in her turn by that of still more ancient Greece; and the modern Brazilian, resting on the glories of such a lineage (coupled with that of an Indian race, scarcely less wonderful, for the Cuzco and other Indian ruins vie with Athens and Rome in the wonderment they call forth from those who know them), owing to heredity and training during all the years in which his character has been forming, is satisfied to leave strenuous commercial transactions and manual labour to others; and thus it has come about that there is always an opening for the more pushing Englishman or European, and until they take the burden on to their shoulders Brazil will not only not go forward, but must go back; and once she starts on the down grade in these competitive days, there is no saying what her future will lead her to.

Then take the *Caboclo*, the rubber gatherer and the cowboy, how can they, as things now are, ever help in their turn? "How can a cowboy be a real cowboy," asks Lange, "when he is underfed and underpaid, if paid at all? The root of the evil lies in two things—lack of agriculture and exorbitant duties on all imported goods—internal revenue

taxes provide other, but less important, factors. From actual experience, I have compiled statistics and ascertained that the ratio of the cost of living in Pará is four to one on the cost of living compared with New York, and the further you go up the Amazon the higher the ratio.”*

Everyone must agree that, for the good of those who have advanced money to Brazil and who wish to trade with and to receive their money regularly and reliably from that Republic, a start must be made, and made soon, to improve matters and so prevent them from going from bad to worse. If this is not done other centres will aggressively push her on one side and ride inexorably over her in the rush to sell their produce against hers (except with coffee) in the world's market. As it is, were it not for the German clerk and merchant, the Italian agriculturist, and the English capitalist the country to-day would be as backward and unhealthy as those wonderfully fertile and richly endowed lands up the Amazon still are, and ever will be until another people, either as emigrants or armed warriors, come to drain and cultivate the land. Will, therefore, the upper classes wait until they and theirs are driven from the country, as many of them deserve to be, or will they assist those in their midst who are less indolent than themselves, and accept Asiatic emigration as the lesser of two evils? Shall it be Asiatics and progress, or the Creole and deterioration?†

All this bears out what I am about to claim from my

* Lange, from whom I quote above, gives the actual cost in Pará, after the absurdly high prices of 1910, when rubber was \$3 = 12s. 6d. per lb., had been reduced. He quotes in dollars and cents, but I put the sterling equivalent as well : Coffee, 20 cents or 10d. per lb. ; sugar, 15 cents or 7½d. per lb. ; matches, 6 cents. or 3d. a box ; rice, 12 cents or 6d. per lb. ; beans, 12 cents or 6d. per lb. ; kerosene, \$1 65 cents or 6s. 10½d. a tin ; salt, \$1 50 cents or 6s. 3d. per 30 lb. (2½d. per lb.).

† The American, as well as the London papers, are discussing the question of Oriental, and especially Japanese, emigration, as I show on p. 310 and in Chapter X.

own experience, viz., that in order to create a new Brazil with the verve, ambition, energy and the will and wish to go forward without which no country can progress or prosper, we must not look for help from the better class of Brazilians. Taken as a whole, they have neither the wish nor ability to assist, whilst the *Caboclo*, like the Indian, will only be able to assist when his constitution is improved and when he has been shown, by example, that it pays to drain and clear the land, to plant vegetables and be independent of the store for foodstuffs. Everything points to the fact that, to do good, the start must be made at the lowest rung of the social ladder, and then to work upwards. Once we start there the progress will probably be quicker than the opponents to the emigration of Asiatics on a large scale would have us believe.

Let us now, therefore, discuss the various Indian tribes and see what those in whom we can have confidence say in their favour, for in the same way as the Pampas Indian in the South responded to the gift of the horse introduced by the Spaniards, and realized how by the help of this animal he could (and did) improve his lot, so, I believe, in time will the Indian in the forests up to the north of Brazil respond to the advantage of having homes to live in, lands to till, food to eat, and men to show them how to appreciate and utilize these, as well as to realize what fair play and evenly distributed justice and protection can do for them. The pure-bred Indian will, I am certain, if properly handled, quickly learn to understand the advantage of utilizing the lands placed at the disposal of himself and his family or tribe for them to obtain, with less labour and more comfort, the food that they need to eat and to barter for other necessities and semi-necessities of life.

The results of the arrival of the Spaniard and his horse is thus described by Colonel Church in the concluding para-

graph of his book: "The horse was introduced into the Pampas of Buenos Ayres by the great expedition of Pedro de Mendoza (1535-6). Five mares and six stallions were the first which were turned loose, and these, together with others which were lost or strayed, multiplied with geometric rapidity, so that before the end of the sixteenth century vast herds of them roamed over the plains. . . . The horse appears to have radically changed the habits, customs and modes of life of the Pampean tribes. With him, as an adjunct to their own matchless physical powers and endurance, they began to look far afield. They found that the horse greatly facilitated the food quest, made it possible to concentrate the tribal sections into masses, and to make tribal combinations for war which, with his aid, could be carried to far outlying regions which they had never before penetrated. Their little home properties and tent comforts could be increased and were no longer impedimenta on the march. To invent or acquire these, awakened their dormant intellectual powers. The horse, in fact, caused the Indian to extend his lines of thought, learn something of the life and habits of distant peoples, exchange ideas with them, plunder or trade with them—in short, take the initial steps in civilization."

Thus the Indian, having responded to this beckoning to "take the initial steps to civilization" in the past, who can say that he will not, given a similar chance, respond to it again now and in the future? Once we know their dormant tastes and intellectual powers can be and have been awakened, surely it will be a serious blunder to insist that they will not awake again. In any case, let us dangle the bait before their eyes and see if they will not come up to the surface of civilization and bite once more.

As it is, ever since the Spaniards first set foot in South America the Indian has received more kicks than

he deserved. There is or was good stuff in him if given a chance to show it, instead of being harassed and exploited, ill-treated, maimed and killed, as he has been ever since 1513, when Pizarro first landed in Peru. Students of South American history and of the revolutions that led up to the overthrow of the Spanish yoke will confirm this, whilst in Mexico, Benito Juarez and other leading men, who in the past helped to keep Mexico in order, were full-blooded Indians, and others still living have a large (if not preponderating) strain of Indian blood in their veins, and owe a considerable degree of their magnificent physique and ability to withstand fatigue, as well as their energy and successful resourcefulness, to that fact.

These details are worth noting because the Amazonian Indians have been so often adversely criticized and condemned as being utterly worthless to themselves and demoralizing to others, that it is as well in such cases, since we wish to populate the Brazilian forests and evolve and breed up a big population of industrious folk in order to make the country happy and prosperous, to consider if this dog really deserves the bad name before you hang or otherwise exterminate him out of existence, or whether it has not been attached to him through no fault of his own, but through the wanton cruelty and rapaciousness of others. Mr. Lange found them kindly enough, as well as fully appreciating the kindness of others.

When one learns of how certain of the tribes—probably those who, being milder and more amiable in disposition, would have been the first to respond to kindly and just treatment—were driven to seek shelter in inhospitable centres where, for sheer misery, nothing apparently was wanting, so that even their persecutors would not penetrate there, one is at first curious to learn who were the relentless foes that brought them to such straits. Colonel Church tells us much

on this point. Running roughly down the notes we have made, we are reminded that on the west and north-west such *conquistadores* as the Pizarros, Benalcazars, Alfingers, Federmans, Quesadas, Espiras and their successors kept the Andes in a blaze, whilst on the Brazilian coast the Indians encountered the lash of the Portuguese and the attacks of those terrible half-breeds, the "Mamalucos of São Paulo," who organized slave-hunting raids all through the Amazon Valley; and then last, but by no means least, there were the Jesuit Fathers, who perhaps, although they may not have killed off the Indians like the others, did more to reduce them to abject servility (and so render them even more helpless and liable to the persecution they have suffered up to the present moment), by *corralling* them in, depriving them of all ability and right to think and act for themselves, and generally reducing them to the level of docile and helpless sheep, so that when the missions dispersed and the poor wretches were cast adrift or immediately sold into slavery, their last state was worse than before, and has continued to be so up to this day, thanks to the rubber traders. These, therefore, are among the chief causes of the present debased state of the South American, especially of the Amazonian Indians, and which have rendered them so easy a prey to the rubber gatherer and his relentless underlings of this the twentieth century, just five hundred and two years after Pizarro first set foot in Peru.

Let us, however, look round to note those who perhaps have suffered to a lesser degree or proved to be the aggressors rather than the aggressed, like the Argentine Indians, for instance. Such tribes cause one to ruminate as to whether something cannot be done within the next fifty years to gain their confidence and teach them to become useful members of the community, either as pure Indians, or, in course of time, by interbreeding them with an outside race, but not with

the scum of the local townships. As already stated, so long as we can establish native colonies composed of individuals who are acclimatized to the trying and unhealthy conditions of the various areas in which they live, it will be easy to improve them physically and socially, once we can improve the conditions amidst which they live. If they have been able to exist in the forest, when these are cleared of useless and troublesome growth, drained of the excessive moisture and generally rendered more inhabitable, an easy but certain step forward will have been made towards raising the status and utility of these, the native Indians, whether in the north or south, and, in raising them, towards helping to raise the foundations of a prosperous and happy Brazil and Latin America in the future.

Those who know the Carib Indian in Venezuela, and particularly in British Guiana (where he seems to have come north, probably from Paraguay, especially around Ascuncion), must admit, as shown in the illustration, that here is a bright clean race out of which something good ought surely to be made, especially when we know that, even in the days of Schmidel (1535-1552) these Indians were remarkable for the fruitfulness of their homes, having "abundance of food, maize, mandioca, sweet potatoes, ground-nuts, fish, meat, deer, wild pigs, guanacos, rabbits, geese, pheasants, honey, and much cotton." What an ideal race for modern Brazil, and Colonel Church tells us (p. 25) they ultimately spread over two-thirds of South America, and wherever they marched or settled, throughout Brazil, the Guayanas, the Orinoco Valley, and the Antilles, they caused themselves to be respected as superiors, and had Nature not forbidden it they probably would have organized an empire far more extensive and powerful than that of the Incas. This being so, surely much good can be made out of their descendants, the Brazilian Tupis, and so-called Tupi-guaranis, who were really

Caraios or Caribs; whilst the Huaraoon or Guaraoon Indians of Venezuela and British Guiana are certainly of Carib descent if not pure Carib—good, that is to say to the Indians themselves, by giving them an area on which they can settle and develop and so help the country in which these many settlements are one day to be found. On this account I hope my readers will study Colonel Church's book* (on the "Aborigines of South America") and note Sir Clements Markham's tribute in the preface to the great knowledge and powers of deduction and classification of the author,† so that although the manuscript was incomplete at the time of his death the amount of information it contained caused those, whose opinion was valuable, to consider that a useful purpose would be fulfilled by publishing it as Colonel Church left it. Not only does the author speak well of the Indian race, but Sir Clements Markham, as editor, tells us in his preface that "It is hoped that the story of the noble Indians of South America, treated as Colonel Church's experience and knowledge enabled him to treat it, will find many readers both in England and in America."

Colonel Church himself brings up this matter when he tells us (p. 13): "It has been argued that the tribes of

* "The Aborigines of South America," by Colonel G. E. Church. London: Chapman and Hall.

† Who, before he was 21, received the appointment of Resident Engineer of the Great Hoosac Tunnel of Massachusetts . . . and was invited not long after to go to the Argentine Republic, where he became a member of a scientific commission sent by the Government of Buenos Ayres to explore the south-western frontier of the country and report upon the best system of defence against the fierce inroads of the Patagonian and other Indians living upon the Pampas and Andean slopes. . . . The Commission rode over 7,000 miles in nine months and fought two severe battles with the Indians, one of which, on May 19th, 1859, was a midnight attack upon the little force (which had a covering force of 400 cavalry when it started) by 1,500 picked warriors of the Huelches, Puelches, Pehuenches, Pampas, Araucanians, and Patagones tribes—naked, and mounted bare-back upon their splendid horses, with their long lances in line.

Amazonia lacked the mental qualities necessary to enable them to emerge from their savage state; but the question may be asked: What has civilized man been able to accomplish during the four centuries he has occupied the Valley? Does he not also lack the attribute or fitness to combat the forces of Nature, to develop and utilize the resources of the Valley, and make it the home of one or more great peoples? In reality, with all his advantages, he is worse fed there than were his aboriginal predecessors,* since there are probably not twenty square miles of the Amazon basin under cultivation, excluding the limited and rudely cultivated areas among the mountains, at its extreme head-waters, which are inaccessible to commerce. The extensive exports of the mighty Valley are entirely derived from the products of the forests." This was written before the rubber boom, which everyone tells us caused the denizens of the Valley to still further neglect their cultivations until everything that the *seringuero* required had to be brought up the river to him. For these reasons, therefore, Brazil would benefit enormously were it proved to be possible to train the Indians to become agriculturists, and so supply locally the foodstuffs they, the *seringueiros*, require; and to this day the Brazil-Guayana area, if not elsewhere, must have numbers of Indians scattered around on which to start, for they are of a type, at present, of course, that cannot go ahead without our help.

Coming now to the Tapuyas, here we have a race that I should imagine could well interbreed with the Chinese and Japanese and produce a strong, useful, if not altogether, to our minds, attractive race, since Sir Richard Burton describes those he met in the great bend of the lower Sao Francisco River as having big, round, Kalmuck heads, flat Mongol

* As we have already shown from Mr. Lange's remarks on living in Pará.

faces, with broad and distinctly marked cheek-bones, oblique Chinese eyes, not infrequently *bridés*. They were well made, except that the trunk was somewhat too long for the legs; their extremities showed delicacy of size and form. Colonel Pedro Suarez mentions some branches of the Pamas, Pacaguáras, Sinabos, and Chacobos, which he considers belong to the Caraipuna tribe, and number, perhaps, 1,000 families, that are fond of agricultural pursuits. They grow maize, sweet potatoes, sugar-cane, pineapples, have some fruit trees, and prepare mandioca flour; and this is quite likely, as they still seem nearly related to their original ancestors, the Caraios or Caribs. Between the Purús and Madeira rivers are (or were) the Catauixis, described as being a fine, handsome people, with a remarkably clear complexion, who were hospitable, peaceable, industrious, and fond of agriculture. The Jamamadi Indians, also of the Amazon lowlands, raise corn and manihot (mandioca, cassava, or tapioca), pineapples, bananas, plantains, tobacco, sugar-cane, and other plants. If so here, so can they, or others, do the same elsewhere.

No one can deny that if with patience and tact modern civilization can draw these savages from the forests, substantial progress will have been made* to remove the bloodstains off the robes of the angel of peace and goodwill, that must have hitherto appeared rather as a devil to the Indians, for, as Colonel Church truly points out (p. 180), aboriginal man in the New World has not derived much happiness and no benefit from the rule of his *Christian* conquerors. Christianity, to them, as they told the missionary fathers of

* "Can I not," Lange asked himself, when speaking of the Araran-deuara Indians, "through patience and frank treatment on equal terms, together with personal gifts and tokens of friendship, perhaps win their confidence? I feel sure I can win over these savages . . . and make them come to me trusting implicitly; overcoming the constant fear they entertain towards all foreigners, *especially* Brazilians." [*Italics mine, ED.*]

yore, must still appear to be the surest road to the loss of liberty and to slavery under the Europeans. To wean many of the tribes or families from their dependence on fish, generally raw, as their chief food, whereby they contract objectionable skin diseases, would be by no means the least advantage to the individual. Several centres, like the basin of the Huallaga River and the valley in its vicinity, could be cleared and drained by the Indians under white supervision, and so ridded of the vast clouds of mosquitoës which keep even the Indians at a distance and utterly preclude any chance of settlement in those parts.

Possibly the *Cholones* Indians, who occupy the district between 7° and 10° S. lat., west from the Huallaga to the Marañon (if still there, for that is the Putumayo area), should be a good tribe to start with, for where Herndon found them, at Tungo-Maria, the head of canoe navigation on the Huallaga, he pronounced them to be better in character than any whom he afterwards met, being "good-tempered, cheerful and sober, and by far the largest and finest looking of the aborigines."

All this may seem to be only a fool's dream: if so, all the better, for children and fools speak the truth, and, this being the case, let us hope that the dream will come true.

CHAPTER II.

MAINLY HISTORICAL AND DESCRIPTIVE.

[Most readers, even of interesting novels, will, when they first pick up a book, turn to the opening and closing pages to see what they look like, and try to ascertain if they will lead the inquirer to believe that the book is likely to be an interesting one to them, as I hope this will prove. Those who do so in this instance may at first be puzzled to see that we start with a discussion on the Indian labour question, and close with some remarks on the Monroe Doctrine and the adverse tendency it has on the future of Brazil, especially as regards a continuation of England's support to her commercial, agricultural and mining industries. Surely it is wise to do so, as you can achieve nothing in such undertakings without the labour, so that is put first, as the best and most tempting plans will go astray, even if the money is there to finance it, if confidence is lacking. Hence the reason why we discuss labour, then tell our tempting tale of the undeveloped wealth of Brazil, that veritable El Dorado that could exceed, if properly handled, the avaricious dreams of the greediest *conquistador*, and conclude by holding up a warning finger to point where danger lies ahead, so that those who are more influential and clever in such matters can see that the obstruction is removed from across the path of progress that leads to the mutual prosperity of Britain and Brazil.]

Rubber, as many writers and travellers tell us, has undoubtedly been known to the Indians of Brazil from very remote periods, and was used by them to make *seringas* or rough balls with which whole tribes amused themselves playing games not unlike football and handball.

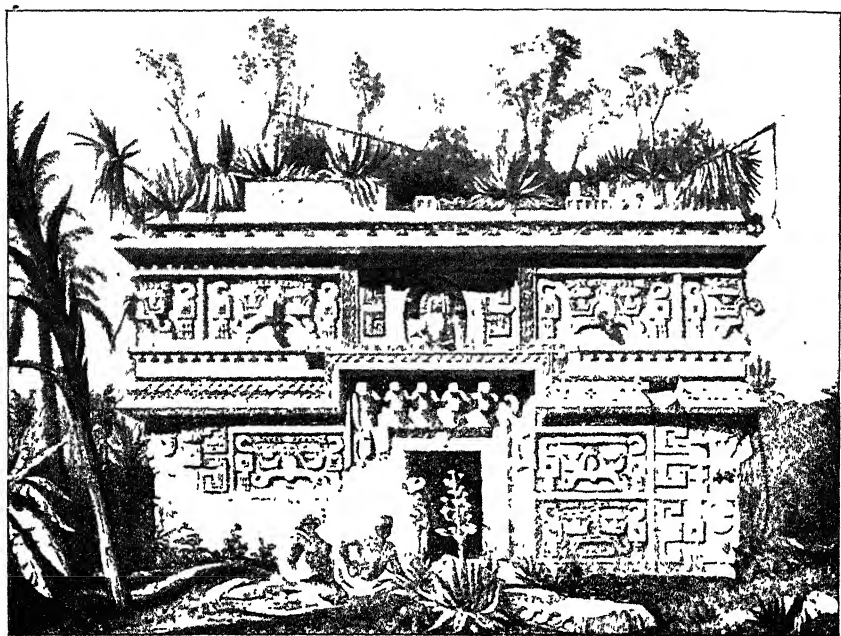
In some parts of the Putumayo the author has seen the Indians at their games with these balls of caucho, and their cleverness with them was really remarkable as they passed the ball from one to the other, impelling it by means of their knees, hands and heads.

Previous to the year 1820 india-rubber from India (*Ficus elastica*) was known, but only used as a means of removing pencil marks. It was, however, the Indians of the Amazon who showed Europeans that rubber had other uses, and *they* knew of its usefulness when Condamine made known the useful properties of rubber in the year 1735; and Priestly, in 1779, discovered that it could remove pencil marks.

It was the Indians who discovered that rubber was waterproof, and applied their knowledge to the making of wearing apparel and foot covering, a use to which it is still applied by the present generation of *seringueiros*.

For many years there was a thriving industry in Pará in the manufacture and exportation of rubber slivers made on the system of the aborigines, while shoes and clothes were even received from Europe to be covered with rubber and rendered waterproof for the use of the military. It will be seen, therefore, that Pará until 1850 exported rubber both in its raw and manufactured form, but since that date the manufacture of rubber goods was not practised owing to European competition, and Brazil remained with its raw rubber industry alone.

In 1825 its exportation of the raw article was very small, less indeed than 30 tons, which realized 36 milreis per arroba of 15 kilos; this increased to 156 tons by 1830, 388 tons



From drawing by Catherwood, 1841. Reproduced from the 'Pan-American Bulletin.'

END VIEW OF A MONASTERY ERECTED BY THE MAYA INDIANS IN YUCATAN, MEXICO.

I suggested to Professor Flinders Petrie that the architecture of Babylon, Assyria, and Egypt might have been inspired by the buildings of the Mayas and Quiches Indians in Yucatan, of which the above is an excellent example, but the learned Egyptologist insists that the African architecture predated the Mexican by many years. This is, of course, correct, the Pyramids at Gizeh are supposed to have been erected between 3000 and 2500 B.C., whilst the Tombs of Abydos, that is of the still older architecture of the first and second dynasties, go back to 3400 B.C. [ED]

by 1840, and then jumped into four figures with 1,467 tons in 1850, and 2,670 tons ten years later.

In 1897 the production of raw rubber from Brazil alone had reached the substantial figure of 21,260 tons, valued at about 13½ million pounds sterling, whilst the average for the five years 1909-1913 was about 42,000 tons, I believe, although some place it at between 39,000 and 40,000 tons only.

This enormous progress was not wholly due to the labours of the Indian gatherers. From all parts of Brazil, but more particularly those states nearest to the Amazon, immense numbers of men of all races and breeds poured into those regions where the practice was to explore the rivers in search of sites to build their homes in the centre of unoccupied rubber lands, of which they took possession.

Here they remained and made continued visits to the villages of Tapuya Indians, who, with their families, lived happily and harmlessly in the bush. They gave them small presents, introduced them to the use of liquor, and eventually succeeded in inducing them to leave their villages in order to work rubber; thus it was that these poor, simple children of Nature were induced to abandon their cattle, their homes and cultivated grounds at the suggestion of the wily adventurer, and to what end? Apart from the misery it has entailed to themselves, it has caused that portion of Brazil to become denuded of its food-producing lands and, owing to the increased cost of the first necessities of life, has brought about, or threatened to bring about, unless remedied, the doom of the Brazilian rubber industry in face of the competition from the East. Without thought these Indians were soon victims of slavery and dishonour, and were lucky if their troubles quickly ended in death. In this way, instead of increasing their labour supply and thus reducing the cost per day, without doing which Brazil cannot prosper, families

and whole villages were completely extinguished, and the cost increased; thus this waste of lives and money still continues.

In the beginning the Indians received presents of food, clothes, sewing machines, firearms, ammunition, and even musical instruments, of which due note was taken, for this needless extravagance was often encouraged in order that their value could run up huge bills, comparatively speaking, to be paid for in rubber by the unfortunate Indians later on. This they were unable to do and were thus reduced to a state of peonage as a result. In the first stages of their peonage or slavery they were, perhaps, employed to navigate the canoes of their self-constituted masters, which were in many cases heavily laden with goods bought in the large towns. The next stage would be the clearing of the bush on the banks of the river, at the spot chosen for a *seringal*, and the construction of houses and compounds for the master, after which the poor aborigines were free to construct rough shelters at a distance or sling their fibre hammocks among the trees.

To supply the needs of these masters, huge stores were established in Pará, Manaos, and the Amazon. These establishments furnished the unscrupulous explorers with money and funds on credit, to enable them to reach the *seringals* or rubber forests, and were known as *aviadores*, whilst the person receiving credit was called the *aviado*. These latter, in turn, as has been pointed out, sold the goods to their Indian slaves for payment in rubber, and soon acquired enormous riches from the usurious charges made for them and the ridiculously low prices paid for rubber, whenever payment was made. To the above two classes of trader already specified there were soon added the exporters, who secured the banking business of the rubber industry and made the largest profits.

This, the system under which the Brazilian rubber trade was instituted, is practically in vogue to-day, and its evils are in a great measure the cause of the crisis in the rubber industry, for it is built up entirely on slavery and peonage, or similar forms of labour, coupled in many cases with usury and oppression in its many and varied forms.

The ease with which money could be obtained in the rubber region of the Amazon in 1907-8, when the boom was on, caused an enormous inflow of peoples from neighbouring states, who abandoned, without thought, huge regions of cattle-raising and cultivated country, and thus caused an immediate dearth of foodstuffs with the inevitable rise in their value; an increased cost being thus generated that continues to this day, when the price of rubber is but one-fourth what it was when the boom was on; villages and towns which were at one time in a flourishing condition were soon completely deserted, and the small-holders, that mean so much for the stable welfare of a country, scattered and generally disorganized; in any case, their economic value has been permanently lost to the Republic. From this cause alone arose a scarcity of natural products of prime necessity, which forced the cost of living up-river to assume enormous proportions and brought about a condition from which the entire region still suffers, and will continue to do so until radical reforms are introduced. How can any centre flourish with fresh meat costing, in Manaos, as much as 1s. 3d. per lb., eggs 5s. per doz., and bread 1s. 3d. the 2-lb. loaf; while at the headwaters of some of the nearest rivers, *farinha* (mandioca or tapioca flour), the staple food of the *seringuero*, may cost from \$3 to \$7 per basket of 30 kilos, no matter what its condition?*

However, it was said that fortunes were made with ease,

* See Lange's estimate, p. 15; and Akers', p. 55; and Woodroffe, p. 270.—ED.

and so great was the number and density of the rubber trees, that in the hurry and eagerness to obtain rubber, the masters became thoughtless and destructive, and when the trees in any district became exhausted from excessive tapping the *seringals* were abandoned and fresh ones taken up. Among the districts which suffered most in this respect were Cametá, which at one time produced rubber of very high quality, and is now almost completely abandoned; the island of Marajó, at the mouth of the Amazon, and those other islands in its vicinity; and the districts adjoining the Rivers Tocantins, Jury, Lower Madeira, and Solimoes.

The best *seringals* to-day are those which exist in the lesser-known rivers and headwaters of the larger tributaries of the Amazon, in the State of Matto Grosso, and the more recently worked areas of the Acre, Purus, and Jurua Rivers.

There is little doubt that the area of undiscovered virgin rubber trees in Brazil is enormous, but it must be borne in mind that under existing conditions it would be difficult and unprofitable to work them owing to their distance from any main or navigable river, or other means of communication. This is a matter, however, that could be remedied in time.

According to records kept by the Government of Brazil it can be seen that the exportation of rubber may be said to have commenced early in the nineteenth century, about 1820. Regular records have been kept, dating from 1827, and a glance through the statistics from this date, which are periodically published, show, as in the case of the figures on pp. 26, 27, the tremendous development of the Brazilian rubber industry, especially between 1840 and 1850. Of the fifty-four municipalities into which the State of Pará is divided, forty-seven produce rubber, the most important being those of Breves and Inajás on the island of Marajó, from whence the grade of rubber classed as "Islands" or

Ilhas is exported, representing about 90 per cent. of the total output of that state.

The *seringals* in the districts above mentioned are undoubtedly the oldest in the Amazon Valley, and this fact has given rise to an idea that one hears expressed almost everywhere, to the effect that these first-discovered *seringals* are now exhausted and that the *seringueros* have been obliged to travel far into the interior in search of new trees, as the old ones do not pay for the labour used in extracting their latex; but this is only partly true. The *seringals* which were established in the estuary of the Amazon nearly 100 years ago have, in some cases, become exhausted through ill-treatment, but they still account for nearly 90 per cent. of the production of the state, as stated in the preceding paragraph.

The discovery of *Caucho* (*Castilloa*) in large quantities in Brazil is of comparatively recent occurrence, dating back about a quarter of a century, when large quantities of trees were found to exist in the highlands in the districts of Obidos, and along the Tocantins, Xingu, and Tapajos rivers; but there is very reasonable ground for fear lest the supply will soon become exhausted if the various governments do not take energetic measures to prevent the cutting down of the trees, as has been done from the start, owing, as is well known to all rubber men, to the *Castilloa* tree not responding to regular tapping as the *Hevea* does. This causes the always-in-a-hurry *cauchero* to cut down the entire tree and, like an animal of prey, to bleed it to death. In doing so the state suffers an irretrievable loss, which, in the aggregate, is really serious.

Having now roughly taken the reader through a very superficial study of the history of the Amazon rubber industry, it will be as well to examine and compare the history of its Eastern and plantation rival, but I will do so very briefly, as Mr. C. E. Akers, who has visited the East, whilst

I have not yet had that pleasure, goes very fully into the comparative details of the two rival producing centres.*

Rubber from the *Ficus elastica* was known to Europeans early in the nineteenth century, but about the year 1875 Pará rubber was the subject of much interest to the island of Ceylon, and, as is now well known, a first large consignment of Brazilian seeds or seedlings arrived in June, 1876, at Kew, the result of about 70,000 seeds collected by Wickham in the region of the River Tapajos. In the same year nearly 2,000 seedlings were despatched from Kew to Peradeniya in Ceylon, in specially prepared cases, by the s.s. "Duke of Devonshire," under the care of Chapman. In November also of the same year Cross arrived at Kew with 1,000 seedlings of *Hevea brasiliensis*, of which only about 3 per cent. were saved, and some of these were later also sent to Ceylon. Small consignments went direct from Kew to Burma, Java, Singapore, and the West Indies. Later movements included 500 plants from Ceylon to British Burma and Madras in 1878, fifty plants from Kew to Calcutta, and another fifty to Burma, both in 1877. Batches of one-year-old trees were also sent from Ceylon to India and the Straits in the same year, but, according to some writers, they either did not arrive or were useless upon arrival. The trees first planted in Ceylon began to flower in the period ranging from 1881 to 1884, according to the suitability of the district and the strength of the trees, and it was during this epoch that the first seeds of *H. brasiliensis* grown outside Brazil were obtained. They were sent to many tropical countries to form the base of experimental stations for the culture of the so-called "Pará" rubber, and it is from this small beginning, dating back

* See "The Rubber Industry in Brazil and the Orient," by C. E. Akers, or the Report on same by the 1911-12 Commission, of which Mr. Akers had charge.

much less than half a century, that an industry has been formed which has grown to be a very serious competitor with that of Brazil forest-grown rubbers, and which, if Brazil "does not put her house in order" along the lines suggested in this book, or by other means, may yet drive her to the wall for many generations to come.

Although the first seeds were sown in 1876, it must be borne in mind that their cultivation was carried on in an experimental manner until about fifteen or twenty years ago, when the planter in the East really awoke to the value of the product, after having been quite content to jog along with his plantations of tea, &c. In spite of this tardy start, the production of plantation rubber had reached over 11,000 tons by the first half of 1913, as compared with nearly 19,000 tons from Brazil, the greater part of the plantation rubber (about 70 per cent.) coming from Malaya.

Plantations of Pará or Hevea rubber now, of course, exist on a very extensive scale in Malaya, Ceylon, Straits Settlements, Java, Sumatra, India, Borneo, Samoa, and a number of other tropical countries, and the early output of the product from them is increasing by leaps and bounds, until the day cannot be far distant when they will be producing many times more than the whole of the Amazon Valley, the original home of the species, as carefully worked out estimates for 1919 place the combined output of the four chief centres in the East at 262,000 tons in that year, but the labour force necessary to secure such an output is unlikely, I fear, to be there, or if it is secured, then the lower price caused by so huge an output (only four years hence, be it remembered, though probably economies practised during the present War will reduce the cost) will at once pull down the value, until in many cases it will fall below the cost of production and thereby automatically cut off some of the supplies.

Until quite recently rubber was almost exclusively obtained by tapping several varieties of wild tropical trees, chief among them being the *Hevea brasiliensis* and *Castilloa ulei*, both indigenous to the huge forests of tropical South America, more particularly the valleys of the River Amazon.

[According to Akers : * " It is from the latex of the black Hevea that the finest rubber is prepared, and when free from impurities, and without any addition of latex from other varieties, it is undoubtedly of exceptional value on account of its high standard of resiliency. The best quality of this rubber is classified as ' fine hard Pará,' whilst the lower grade is placed on the market as *entre fina*. . . . From the white Hevea the rubber obtained is designated locally as *fraca* (weak). It is, however, of good quality, and the *fraca fina* and fine island grades sell readily at only 20 per cent. less value than the fine hard Pará. It has less resiliency than the product of the black Hevea, and, as a general rule, less care is taken in its manufacture, with the result that the percentage of impurities is greater than is the case with the rubber from the upper rivers. The latex from the Itapirú (*H. guayanensis*) and the Bariguda (*H. spruceana*) is mixed frequently with that from the white Hevea whenever those varieties are plentiful in the neighbourhood . . . some seventeen varieties are known to exist, the most common being the *H. brasiliensis*, the *H. guayanensis* and *H. spruceana*. . . . "†]

The latex of the *H. brasiliensis* is, of course, when properly cured, known as " hard fine Pará rubber," and it obtained this name from the Brazilian town of Belem do Pará, owing to this being the principal port of shipment whence the raw

* " The Rubber Industry " (p. 3).

† See list of ten varieties, p. 110.

article was first exported to European and American markets. The rubber, however, is gathered in the Amazon forests, in many cases thousands of miles from the port, and sometimes not even in Brazil. Castilloa, the next in importance of the South American rubber-producing trees, gives us the grade of rubber known as "Caucho,"* and represents nearly one-fifth of the total amount of rubber exported from Brazil.

Other American rubber-producing trees and plants are *Castilloa elastica*, a species found in Central America and Mexico; varieties of maniocoba, such as *Manihot glaziovii*, *M. dichotoma*, *M. heptaphylla*, and *M. piauihyensis*, all from the Northern States of Brazil, from which about 2,000 tons of rubber are produced each year; while the *Mangabeira Hancornia speciosa* is also extensively tapped in various parts of Brazil.

The following are among many of the reasons which, combined together, have rendered the East a serious rival to Brazil, and those who wish to see the Republic maintain its supremacy would do well to note them:—

(1) The suitability of the soils and the similarity of the climates with those of the Amazon.

(2) Cheapness of labour in the Eastern plantations up to the present.

(3) The large returns which were shown to be probable by the financial propagandists during the "rubber boom" of 1909-1910 and 1911, when the raw article reached very high prices.

(4) The assistance given to the planters by local governments when the plantations were in the experimental stage.

(5) The possibility of systematically and profitably tapping (for the time being) the trees when six and sometimes even when only four or five years old.

* French, *Caoutchouc*, possibly a corruption of the original Indian.

(6) The training of the trees to give up their latex, by accustoming them to repeated tappings at early stages of their growth; by these means yields have been obtained of as much as $2\frac{1}{2}$ lb.* and more of dry rubber per tree per season at an age at which Amazonian forest trees are rarely tapped in well-directed *seringals*.

(7) The ease by which the latex can be coagulated by means of new, inexpensive, quick and generally well-organized methods, which assures, at a nominal cost, a finished product of great purity and high value, almost equal to "fine hard Pará."

(8) Better food, as well as sanitary and hygienic conditions generally, for the workers.

The most successful of the Eastern plantations have been those of Malaya; this is mainly due to the greater suitability of the climate and the virgin soil, coupled with a general similarity to those of the Brazilian rubber centres. Less successful results have been obtained in Ceylon, Java, Cochin China, &c., where greater dryness discourages big yields; while the results obtained from the planting of *Hevea* in other parts of the world have been small, and in a great number of cases have proved of no value for the production of this particular class of rubber. The trees may flourish, but do not produce latex on a commercial scale.

Castilloa ulei, or caucho, has also been the subject of experimental cultivation, but with little or practically no results of commercial value, whilst the *Manihots* (*M. glaziovii*, *M. heptaphylla*, *M. piauihyensis*, *M. dichotoma*) or *Maniçoba* kinds have been extensively and successfully cultivated in some of the States of Brazil, mostly in their own homes in Bahia and Piauihy.

* "There can be no small doubt that in 1919 the average production (in Ceylon) should be at the rate of not less than 4 cwt. per acre."—Akers, in "The Rubber Industry," p. 163. Other estimates, and even actual returns, are said to exceed 4 cwt. = 448 lb. per acre.

All the evidence obtainable, including much that has been written upon the sources of rubber by scientific writers, distinct from those who have been influenced by commercial and other reasons, goes to prove that there can be no doubt that *Hevea brasiliensis*, especially the so-called black variety, will be the principal future source of the world's supply of raw rubber, and all others must tend to disappear from the markets, unless it pays to cultivate the Manihots in the dryer soils where Pará will not grow or, at least, will not yield. As one authority put it, Hevea will be planted where the yield repays the cost, and the Manihots in those districts which are too dry for the Hevea.

Some are of opinion that cultivated or plantation rubber will take first place to the exclusion of the Brazilian forest or plantation rubber, and in the subsequent chapters of this book the claim put forward by the planters will be closely studied from all points, for and against this belief, and I shall endeavour to show how the wild or unplanted (by man) Brazilian rubber industry can or will be able to maintain its undoubted supremacy, certainly as regards quality, and that it is not at present in such a deplorable condition as it is to the interest of its rivals to make out.

Once give Brazil a cheaper, more efficient, and a steadier class of labour; reduce the taxation and cost of transport on the rubber by encouraging other industries to spring up to take some of the taxation burden on their shoulders; appoint a better class of lower grade official and bring about a total absence of the exploit-at-any-price bully, which should be hunted down like the wolves were in England, and then, but not till then, will Brazil be able to hold up her head against the East, and perhaps having some advantages that are lacking there, be able even to beat the Orient at her own game of rubber production. This, however, cannot be brought about by the Brazilians alone, especially by the bulk of those who are directly responsible for the

output of rubber from the forests. It always will be, and must be, an international question, divided up between the large consumers of rubber and those countries having the heaviest financial stake in the Republic. If Brazil wishes to go on borrowing money in Europe, and, above all, if this and other countries interested in Brazilian securities wish to receive their dividends punctually, which we are not doing at the moment (December-January, 1914-15), steps must be taken to place the Brazilian rubber industry, being the most important revenue yielder in the Republic, on an honest and economical basis, and put down with a firm hand the many abuses and extravagances that now threaten its existence.

Doing so is certain to cause friction and probably bloodshed, but if we in England can sacrifice our best and bravest for "a scrap of paper," we feel certain that Brazil can do the same, if needs be, in order to maintain her position among the leading countries of the world, by keeping her head above the waters of debt which undoubtedly threaten to submerge her at the moment; she must also get out of the habit of flying to others for money the moment she feels the pinch, often to only fritter it away when she has got it. If those who get money the easiest spend it the easiest, those who strive the hardest for it appreciate it the most. Brazil must belong to the last-named and not, as heretofore, to the first.

[“For two or three years after the close of the War,” wrote Mr. J. P. Wileman in his market report, popularly known as “Mostly about Coffee,” dated November 10th, 1914, “we can expect no great revival of credit and must not only live on our own resources, but take the steps indispensable for providing for the renewal of the service of the foreign debt at the expiration of the funding loan. To that end two things are essential; first, to so stimulate internal

development that, when the war finishes, we shall be in a position to supply consuming markets with what they require, and meanwhile to restrict certain exports in such a way as to prevent our produce being sold at a dead loss,* and keep foreign exchanges from falling. The British Government has strained even its immense resources to maintain facilities for trade unimpaired, and that Brazil could escape her contribution, or hope to come unscathed out of such a cataclysm is vain. She, too, must adopt her 'war' measures and defend her economic interests by means that in time of peace might seem as extravagant as some of the measures adopted by Great Britain no doubt seem to outsiders."

In a later issue of the same periodical, viz., of December 8th, Mr. Wileman, when discussing the funding loan, tells his readers: "For a long time back it was evident that, loan or no loan, Brazil could not for long support the burden of its overgrown debt. Development not having kept up with increased indebtedness, and having failed to supply the funds requisite for the increased service, default was but a matter of time.

"Indeed, the country is to be congratulated on the failure of the foreign loan that was so near to completion when the war broke out, as it would only have added, in the long run, to the difficulties of the situation and made ultimate default more painful and discreditable. The fact cannot be got over that production in Brazil is not on a par with foreign obligations, and that until they can be balanced, funding or any other schemes for renewing payments are but premature and unavailing sops to creditors.

"The causes of the débâcle are not far to seek—extravagance; whilst over-taxation (federal, state and municipal)

* Mr. Wileman is here thinking mainly of coffee.—ED.

explains too clearly why, in a land enjoying every advantage of soil and climate, this country has failed to meet competition or to produce at a profit excepting in cases like coffee, where there is a virtual monopoly.

“The principle of the funding loan is the capitalization of interest for a series of years, in fact, of paying interest on interest instead of on capital.

“Apart from its arbitrariness, the fact that holders of foreign debt bonds are deprived of the interest on their investments, in some cases their only means of livelihood, whilst those of the internal debt go scathless, requires no enlarging upon. Unquestionably, suspension of the service of the foreign debt, in the condition Brazilian finances had been reduced to, was inevitable. But the same causes that prompted Government to act so decidedly in regard to the foreign debt were* no less active as regards the home debt, seeing that, were that also funded, the gain to the Treasury would certainly go a long way towards making administrative deficits good.”

Was ever appeal to a country to “put its house in order” more aptly and temperately worded? Those in Brazil might wish to criticize Mr. Woodroffe’s remarks in this book, claiming that, in spite of his seven years’ sojourn in their midst, he, having been buried away in the wilds, was not competent to judge for the whole area, and that I, not having been south of Venezuela, was still less so. This authority, however, writing from the capital itself of Brazil, some months after Mr. Woodroffe had sent in his MS., fully confirms all that that gentleman asks for or suggests, so I feel now on reading it that the most indifferent or indolent Brazilian will try to “make good” both for himself and his country.

* I suppose Mr. Wileman means “should be no less active.”—ED.

As the Amazon rubber of commerce includes that which comes from Bolivia and Peru, where the language is Spanish, the following terms should be taken note of, as well as the Portuguese equivalents used throughout this book. I have taken them from a book on Bolivia, by Colonel Pedro Suarez, which was given away at the last (1914) London Rubber Exhibition.

Seringuero is the workman, or tapper, in charge of an *estrada*, which he has to work daily from 4 a.m. until past midday.

Estrada is a section of the forest containing from 100 to 150 trees connected by a footpath. It is the portion allotted to each *seringuero* to work.

Seringal is the name given to a large group of rubber trees. It generally contains a sufficient number of trees to form several *estradas*.

The tools used by a rubber worker are as follows: The *machadiño*, the *tichela*, the *vacia*, the *mango*, and the *buyon*.

The *machadiño* is the small hatchet, or tapping tool, with a long handle, so as to reach some distance higher than a man's head. Its weight must not exceed 3 oz. The incisions made by it run in parallel lines horizontally round the tree from top to bottom, at a distance one from the other of about half a yard.

Immediately after making the incision, a *tichela* or latex cup is fixed to the tree about an inch below the incision for the milky juice to flow into it. There are three sizes of such cups used, these being selected according to the quantity of juice in the tree. The number of cups required depends on the circumference of the tree, and ranges from one to ten, sometimes more, as in some cases the trees are of such huge dimensions that they can bear sixteen and even twenty incisions daily.

The rubber worker is obliged to go over his ground

twice before his work is done; the first time to tap the trees and fix the gum cups, and the second to collect the juice from the latter. The *estradas* are traced out in such a way that the path from the last tree meets that from the first, thus forming a continuous lane. As soon as the tapping is finished the rubber worker puts aside the small axe and takes up the *valde*.

The *valde* is a galvanized iron bucket used to collect the juice from the tapping cups, and is sufficiently large to hold two, three, four, or five gallons, according to the size of the *estrada*.

After collecting all the milk the rubber worker goes to his hut, and whilst preparing his breakfast he ignites the *buyon*. This is an earthenware flue used to collect the smoke from the fire, made with fuel specially selected for the purpose of curing the rubber. This flue is 2 ft. high, and has very thick sides; it is of conical shape, with an opening in the top through which the dense smoke of the *caroso* comes out.

The *caroso* is the fuel selected for the coagulation of the milk; it consists of palm nuts. A sufficient quantity of these dried seeds is previously collected for the day's requirements; but if the district does not abound in them, or a stock is required to last over a longer period, larger quantities are then collected beforehand.

The smoke which comes through the opening in the top of the *buyon* should attain a certain specific degree of heat, which an experienced rubber worker knows at once, and then he takes up the bucket with the milk and removes it to the *defumador*.

The *defumador* is a small room used for smoking the rubber, completely closed so that the wind cannot interfere with the operation of curing.

The curing, or smoking, a most tedious part of the

operations of a rubber worker, consists in pouring the milk over a mould and then turning it round over the opening at the top of the *buyon* until the milk is dried up, when the same operation is repeated until the milk is exhausted or the biscuit has attained the desired size. The first part of the curing is attended with great danger to the operator, particularly if he is inexperienced, because he may be easily asphyxiated at the very outset of the performance. To carry out this part of the work he requires a *mango*, or wooden mould, on which the rubber is cured. It is generally round—a disc of about 9 in. in diameter—and has a handle, 1 metre long, attached to it.

Before the curing commences the milk is poured out into a zinc basin, 30 in. in diameter. The milk is then poured over the mould, which is afterwards held over the *buyon*, this being repeated until all the milk is used up. The best rubber workers, who tap 200 trees or more, adopt another plan, which considerably facilitates the tedious work of curing the large quantity of milk which they collect, this quantity in certain cases exceeding five gallons daily. They work with *buyones* having three openings instead of one, the three being in a line; over the *buyon* they place a *mango*, with double handle (*mango* in Spanish means a handle), which revolves over a frame which supports it. The disc is in the centre of the *mango*, and the rubber worker with one hand pours the milk over the disc whilst with the other he revolves the *mango*. In this way these men are able to prepare, during the course of one day, biscuits of rubber weighing thirty, forty, and even eighty pounds.]

As regards the tapping the rule of making the incisions, beginning at the top and continuing downwards, must be strictly adhered to, and they must run in a straight line round the tree at a distance of 2 in. below the previous

row of incisions. This order of tapping is known as the *reaccion*. The first incisions on trees which have never been previously worked, or which have not been touched for a long time, are designated by the rubber worker as *sangrias* (bleedings). They are made for two or three consecutive days, so as to loosen the bark, which at the commencement prevents the juice from flowing freely, the latex coagulating immediately it comes in contact with the air. It is a well-known fact that the tree, after it has been repeatedly tapped, gives out a larger quantity of milk, but great care must be taken not to overtax its strength. This is caused by the secretory vessels, stimulated by the repeated bleedings, exciting the lacteal vessels or lacticiferous cells to produce more juice or latex.

When each incision has exhausted its supply of milk, a transparent yellowish liquid comes to the surface of the bark, which coagulates the milk as it comes out of the secretory vessels. This is called the *linfa plastica*, and is the substance which heals the gash made by the tapping, thereby preventing the air from getting to the interior organism of the tree.

Curing, or smoking, is essential to bring the quality of the rubber to its highest standard; this being in most demand by manufacturers in the United States and in Europe. When the biscuits, thus prepared, are cut they present a surface with a large number of lines, each of these lines representing a coating of milk during the process of smoking. These layers can be easily separated, and are made of such fine texture that, with great tension, they can be stretched to such an extent that they become transparent, like a sheet of glass. This is the distinctive property of fine rubber.

The weight of each biscuit should not exceed 50 lb., because as the biscuit grows larger the thickness of the coats

of milk increases in proportion, and the large bulk, together with the excessive weight, prevent the biscuit from being turned round fast enough, thereby preventing the proper and adequate curing.

Elsewhere it has been shown that the hours of a good *seringuero*, generally speaking, commence before dawn and continue until about 3 p.m., that period being divided between the collection and preparation of the latex. At the end of the day it is not difficult to realize the state of the *seringuero*, for he will be found, after he has finished smoking his day's collection of latex, with tired, sore eyes, sunken and smarting from the effects of the smoke; his body racked with spasmodic coughing and covered with smoke, dirt, and soot; his whole condition one that must excite the sympathy from every man of thought and feeling, two characteristics, unfortunately, which are, more often than not, absent from the denizens of the rubber-producing areas. This being so, how can any industry be expected to flourish when carried on under such conditions which are far worse even than those of the factories over here before the Factory Acts were passed, when men seemed to think that so long as the few made money the country must flourish, no matter how quickly they killed off the many.

From this work and from the long periods spent among the swampy jungle, every *seringuero* soon becomes distinguishable from other classes of labourers, owing to the extreme pallor of his face and the yellowness of the remainder of his jaundiced body.

The actual process of tapping up the Amazon varies very little, the only real difference being in the direction or method of making the incisions in the bark, that most in use being oblique (/), whilst others are vertical (|), horizontal (—), shaped like a V or W, or in the forms of crosses (+, ×).

The last mentioned are considered to be very damaging to the trees, so are rarely used, and the system of tapping mostly adopted up the Amazon has not been changed from that in vogue by the Indians when the value of rubber was first made known to the earliest colonists. It is true that in a few isolated instances experiments have been made with modern appliances and plantation methods of tapping and curing rubber, but so conservative are the majority of masters and men that it is very difficult to induce them to abandon the *machadiñho*, which, by the way, Labroy, as stated on p. 103, recommends shall continue to be used.

The Brazilian Government voted a large sum of money to an Association for the Defence of Rubber, and its representatives have conducted a costly and strenuous campaign, trying to induce the *seringuero* and masters to use modern and, perhaps, better methods, but very little progress has been made owing to the poor response of those whom the movement was meant to benefit.

The reforms they recommended were, no doubt, excellent on paper, so far as they went, but they have never started at the beginning (*i.e.*, by improving the native labour), and until this is done no good can be looked for, for how can our building be expected to weather the storm so long as its foundations are allowed to remain so defective and rotten?

Smoking, meanwhile, good or bad as it may be for the man, continues to be the commonest method of curing hevea in the Amazon, and the process in vogue, although crude, produces a grade of rubber superior to any that has been produced in Eastern plantations, a fact that has not been lost sight of in the East, for as Messrs. Gow, Wilson and Stanton, Ltd., the rubber brokers, stated in their last (January, 1915) annual report (see *Tropical Life*, January, 1915, p. 12), this is undoubtedly due to the antiseptic properties contained in the smoke from the woods and nuts used in curing, all of which are peculiar to the

Amazon, growing always in rubber-abounding regions. They are very rarely found elsewhere (although I have seen some nuts from British Guiana that are undoubtedly *urucuri* or *Inaja nuts*), and the Government, realizing all this, refuse to allow outsiders to have even a living specimen, lest, by planting it, the trees should be cultivated elsewhere, as the rubber was, and so cause Brazil to receive a further set-back as regards her supremacy among rubber producers.

I agree with those who are endeavouring to keep these nuts peculiar to Brazil, as from personal experience I am of opinion that they form one of the great assets of the Amazon growers and exploiters of wild rubber, whilst their absence may explain the partial failure, so far, of the attempts to successfully smoke plantation rubber to compete with Brazil, the failure being due to the different chemical composition of the smoke from the trees used in the East and elsewhere, although the last (1914) London Rubber Exhibition included some important specimens of plantation rubber prepared *à la Amazonas*.

Those that wish to see plantation rubber areas extend throughout Brazil are, in some cases, advocating their establishment in order to bring about the betterment both of the industry and its workers, by removing the present disadvantages: (1) The vices and ignorance of the Amazon dwellers, debased by the methods employed in their work and by the unhealthy conditions generally with which they are surrounded and rendered still more onerous by peonage. (2) The high cost of transport, food, &c., and the difficulties in reaching foreign centres. (3) The want of attention on the part of masters and men to simple rules of hygiene and sanitation which causes many deaths from illnesses that could easily be avoided, but which at present are further aggravated by the bad food and life of the jungle. (4) The almost absolute deficiency of fresh food due to want of attention and interest in gardening, hunting,

fishing, &c., even for personal use or profit, and, let us add, an indifference generally to all that makes life bearable and worth fighting for. (5) The wicked encouragement, on the part of the traders, of the vanity of the gatherers for needless rubbish of no use and often a hindrance in the localities, where they soon deteriorate after benefiting no one but the importer or seller who purposely "eggs on" the *seringueiro* to buy them, as not only does their sale mean more profit, but the debts thus contracted at so low a cost generally place the hitherto free man in the grip of the "peon-slaver," all of which does not exist on the Eastern plantations.

For these and other reasons, generally due to waste and needless expenditure, nearly the whole of the Amazon *seringais* are mortgaged to commercial houses in Manáos, Pará, and the smaller towns, the proprietor relying upon the mortgagees for his merchandise and, as a rule, binding them down to deliver to him alone. The whole organization reminds one of the saying that the biggest fishes eat the bigger ones, who, in their turn, prey on the little ones, whilst these, the little fish, eat mud. Such concerns depend almost entirely upon profits from the sale of their goods to the *seringueiros* and other labourers they employ, directly or through others, to cover their living and general expenses, whilst the profits from the rubber go to pay interests, and when prices permit, to reduce one or other of the mortgages that are always hanging over them.

Very few of the actual proprietors are therefore able to buy their goods in open market, and some do not personally superintend the administration of their properties, preferring to leave such work to others and live upon the rent produced; and as the eye of the master is needed to fatten the horse, how can the *seringueiro* or those placed over him be expected to plant foodstuffs and live at a higher level of comfort if the *patrão* himself is so indifferent? How, again, can Brazil

ever expect to compete against the East as regards cost, so long as she continues to put out her rubber amidst such costly, wasteful, and generally undesirable conditions?

The actual administrator of a *seringal* is known as the *patrão*. He buys on credit his goods from the commercial houses, called *aviadores* (as shown in the preceding paragraph). These houses send their launches up the rivers in which they have customers, with the goods necessary for the support of these *aviados* and their clients, the *seringueiros*. These voyages are made at periods ranging from once a fortnight to only once a year. The *aviado* receives his goods on the launch's upward journey and puts his rubber on board on the downward or subsequent voyage. When delivering rubber it is his rule to hand in his orders or indents for further supplies. These are carefully examined and are only despatched in their entirety when the financial condition of the *aviado* warrants it. If his position is such that there seems to be a risk of delay in deliveries of large quantities of rubber, the *aviador* curtails it, and sends only what he considers to be absolutely necessary. Fifteen and even ten years ago, however, this was not the case, for any *patrão*, whether owner or tenant of a *seringal*, could obtain almost unlimited credit, even to such things as jewelled watches, pianos, furniture, diamond rings, and other valuables, as well as costly clothing for himself and women-folk. On account of the unpaid debts thus piled up quite a large proportion of the Amazon *seringals* are now owned by the commercial houses in Pará and Manáos through their being obliged to take them over in satisfaction of their claims, and relet them to third parties or employ their own managers. This is not common to rubber or to Brazil, but affects agricultural industries in all countries. Wise would be the law-maker who could devise a means whereby we could return to the old Jewish rule, that no property

shall be permanently alienated, but must go back to the original owner every twenty-five or fifty years. Nothing breaks up the prosperity of a country so rapidly and so irredeemably as does this ousting of the proprietor by the money-lender, who gets them all in his net in time, large and small, agricultural prince and peasant alike.

The *patrões* buying on credit naturally pay exorbitant prices for their goods, already at a premium owing to the cost of freights, inter-provincial and municipal charges, to say nothing of the margin added to allow for bad debts.

Some *patrões* buy their goods in Manáos and Pará at landed prices, plus 20 per cent. or 25 per cent. commission to the vendor, themselves paying the river freight and other charges; others buy at sight at fixed prices, which include delivery. Both systems have their advantages and disadvantages, but whichever course is followed the difference in the original invoice cost landed at Pará or Manáos and the cost delivered at the *seringal* is enormous, in many cases the landed cost price, as can easily be imagined, being more than doubled and even trebled. The rates of interest charged by the *aviadores* from date of invoice of goods until date of sale of the produce, delivered in part or whole payment, varies from 10 per cent. to 20 per cent. alone, and in some of the more distant rivers the period elapsing between the invoice date of goods and the sale of the rubber in payment of same is as much as twelve months, eight of which may be taken up by the launch on the upward trip with the goods and three on the subsequent downward one with rubber; all this interest enormously increases the cost of the goods to the *aviado* on the *seringal*, who, in his turn, fleeces the *seringuero*. This is one of the several avoidable reasons why the East can produce her rubber more cheaply than the West.

It has been shown that the *seringuero* must depend upon the *patrão* for his requirements in the way of implements,

food, clothing, firearms, &c., and in turn must buy them at prices which to Europeans appear to be inconceivable. The further away from Manáos or Pará he may be, the more he pays for his needs, and the less he gets for his rubber; this explaining in part how easy it is to enslave the workers in distant rivers by running them so deeply into debt that repayment is impossible.

In the Lower Amazon, however, the case is different. Here most of the dwellers are natives and live all the year round on their own small properties. The *seringueiros* of the more distant rivers are natives of Ceará and Maranhão, from whence they are originally brought in batches of from twenty to 100 at the expense of the *patrão*, and are only too glad to take advantage of any opportunity of leaving their native state, where their lives are spent in penury and their principal food is a mixture of farinha and water, owing to the sterility of the soil and poor pay of labourers on the ranches. When, however, the cotton crops are good the Ceará men, I am told, get more money, and so stay at home. A bumper cotton crop in Brazil, therefore, means a smaller labour supply that year for rubber.

Before leaving his home each *seringueiro* receives an advance to pay local debts and cover the cost of his passage and expenses to the rubber centres. This payment often amounts to 500 milreis (about £35), upon which the *seringueiro* pays 20 per cent. commission. Besides this he is obliged to buy all his requirements exclusively from his *patrão* and to deliver to him all the rubber that he prepares, as well as to give his services for all labour which may be required of him. How much money, or its equivalent, therefore, can remain to the man with which to eke out, not a living, but an existence even? How can Brazil or any centre flourish against the competition of the East when founded on a system so debased and depressed?

Before commencing the *zafra*, as the tapping season is

called, the *seringuero* is furnished with the implements necessary for tapping and curing his rubber, firearms and ammunition, and such foodstuffs and supplies as farinha, sugar, coffee, rice, lard, dried meat, beans, tobacco, salt, kerosene, soap, spirits, medicine, clothes, and a few oddments. The value of the goods and money advanced to him before he has commenced his labours varies in some parts from £50 to £200, with £100 as an average,* and the only means he has of repaying this amount is the rubber which he is able to produce.

[To sum up, generally, it would seem that a legally owned *seringal* has first to pay certain taxes and Government charges for the right of working the area allotted and then to satisfy the *matteiro*, whose fees are excessive or certainly costly; between these, that, and the other expenses, it is reasonable to suppose that an estate of fifty *estradas* can cost about £1,000 to open it up before a single tree can be cut.

Those of us who are given to discuss the pros and cons of the Amazon rubber industry are aware of the excessive charges imposed upon the rubber for freight, taxes, &c., "loss of weight" and the other forms of "graft" at the shipping warehouses, all of which impositions could be removed or modified until they assume a legitimate basis; but few outside the "know" realize how much has to be paid to the *matteiro*, viz., 4s. per tree, apparently, i.e., £1,000 for about 5,000 trees, to put a *seringal* on a tappable basis. No wonder that at present Brazilian rubber finds it difficult to compete against the Eastern product since, besides all the charges mentioned above, every tapper is reckoned to cost his *patrão* quite £100 by the time he stands up under the trees to tap them, after the *matteiro* has marked them out.

* See also Mr. Woodroffe's "The Upper Reaches of the Amazon," p. 216.

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Here, again, there is another £5,000 (fifty tappers, one to each *estrada* on the *seringal*, at £100 each), making a total of £6,000 to be disbursed before one can start working. Then comes the rub; what is there to be got in return for this from the four or five thousand trees to be tapped, even supposing every tapper lives throughout the *zafra* or tapping season, and brought all the rubber he secured to his *patrão* without bolting with it, or stealing and selling a portion only? According to Labroy and Cayla's report, the average *estrada* gives 200 to 300 kilos annually, which, with Labroy's proportions of the three qualities (fine, 63 per cent.; entrefine, 10 per cent.; scrap, &c. (*sernamby*), 27 per cent.)* would only be worth up-country about 1s. lb. all round probably, compared with prices for the various qualities in London or New York. Taking the average return as 500 lb. this, at 1s. per lb., means only £25, against the cost per tapper of £100, to say nothing of the 4s. per tree already expended over the *matteiro*.

How can the rubber industry pay in Brazil, or anywhere else, if this is the state of affairs, as I believe it to be? One often hears it stated that the Brazilian sells his rubber without really knowing what it has cost him, and from all I have seen and read, coupled with Mr. Labroy's report, I can well believe this. Furthermore, I feel that it must cost about 4s. per lb. (500 lb. for £100 or 2,000s. advanced to the *seringuero*) for collection, plus, at any rate for the first year, another 1s. or 10d. per lb. (the proportion of the 4s. per tree, each yielding apparently 4 to 5 lb.) towards the amount

* Compared with this Akers gives the following comparisons:—

Grade				Tons	=	Per cent. of total.
Fine hard Pará	...	...	...	16,971	=	39'12
Entre Fina and Fraca	...	...	...	8,860	=	20'44
Sernamby	...	...	...	7,400	=	17'07
Caucho (Castilloa)	...	...	...	10,131	=	23'37
					=	
Total	...	...	...	43,362	=	100'00

paid to the *matteiro* for opening up the *estradas*. Even put this as a capital charge carrying interest (perhaps at 20 per cent.) and 20 per cent. sinking fund, the cost is still abnormal, and if these calculations are not correct, I shall be only too pleased to hear so, and learn what the actual cost really is.]

Besides their cost the quality of the goods furnished to these *seringueiros* leaves much to be desired, especially as regards the foodstuffs, not so much because of their original cheapness and hence inferiority, but because of the excessive handling and transport over long distances in the hot, moist climate in which the *seringueiro* lives; and as most of the foodstuffs (produced in South America) come from the south of Brazil *via* Pará and Manáos, in steamers whose crews pay little or no attention or care in handling them, the final condition of some of the provisions when the *seringueiro* sits down to consume them can be more easily imagined than described. No wonder that the industry languishes, that whilst the scum of the towns, which is capable of any crime, wax fat at the expense of the *patrão*, the conscientious worker becomes lean unto death under him.* Thus is it that Brazil tends to kill off the better class of men, who might and would help her, and leaves those rascals whom no one can injure unless more debased than themselves, which is impossible.

Let us follow the transport of these perishable foodstuffs for a minute. From the Customs warehouses, where they may have lain for a considerable period, they are eventually transferred to the traders' stores. Here they may lay another lengthy period until shipped aboard a river steamer and carried up river, until, with or without further delay, they

* See "The Upper Reaches of the Amazon," p. 222, *re* the scum of Pará and other centres enlisting as *seringueiros*, and, having secured advances, abandoning their work. Such proceedings, of course, all tend against the industry in the aggregate.

are delivered at some *seringal*, after having been carried thousands of miles by ocean and river steamers, rail, mule-back, and canoe. Many of the articles so transported could be grown by the *seringuero* at his very door, yet I have seen beans and rice completely ruined by weevils, not to mention putrid, dried meat, barely fit to be thrown to the dogs, all of which goes to form the daily meals of the *seringuero*, as I know to my cost, having myself been obliged to live upon them.

[And yet this need not be. Further on (in Chapter XX) the question of growing beans and other provisions, and of keeping pigs, poultry, &c., is discussed. Even as things are, however, if the *patrões* could but realize that it is to their interest to feed the men (*i.e.*, the genuine, conscientious worker) better, they would attract more of that class and less of the scum, who only rob and cheat them, even at times killing one or two of them if needs be. At present the *seringuero* knows that complaint is useless, for the simple reason that there is no other means of obtaining his food. Mr. Akers gives an interesting table in his book (p. 89), which I will quote here to show the extravagant price the food costs; and these rates are by no means the top price, for, of course, the further the man is from Pará or Manáos the more money he pays for his supplies and the less he nets for his rubber, and so the harder becomes his lot generally.

		s.	d.			s.	d.
Rice	...	2	7	per kilo.	Farinha	...	0 8 per litre.
Beans	...	2	7	"	Kerosene	...	1 0 "
Coffee	...	2	10	"	Lard	...	2 4 per kilo.
Sugar	...	2	1½	"	Tobacco	...	13 4 per pkt.
Dried meat	...	3	2½	"	Matches	...	2 2 "
Salt	...	0	9½	"	Cigarette papers	...	0 10 "
Soap	...	1	6	"			

Surely any ordinary man could grow something in the months he is on the *estrada* to save on such rates, or it

would pay others to squat for the time being and produce food for surrounding *estradas*, and until something is done to pull down these costs (for what is often bad food), the *seringuero* must deteriorate and the industry with him.]

Masters, employés, and, in fact, all who work on rubber properties, however, get accustomed to such paltry fare, and there is no doubt that 15 per cent. and more of the Amazon death-rate is attributable to this cause alone, whilst the (avoidable) continual sickness and debility of the men generally further militates against success in several ways.

There are a few *seringueros* who are able to do without the assistance (*sic*) of the *patrão* and can buy their goods from Manáos or Pará direct, paying cash for them. Such men are able to obtain their goods sometimes as much as 50 per cent. below the prices paid by their less fortunate fellows, and there is no reason, if the industry is to be saved to Brazil, why this class should not be encouraged and increased. This can be done if the industry can only shake off the "credit" system founded on needless expenditure, wilfully and deliberately encouraged by those who, in fattening on the trade themselves, are causing it to die out through sheer exhaustion. Get rid of these parasites and the Amazon rubber industry will take at least one step—and a big one too—in the direction of success.

Meanwhile, however, the agreements governing the renting of *estradas* are based generally on either of the following systems:—

(1) All rubber produced must be sold to the proprietor, who makes it a condition that he may pay in goods or cash, or send the rubber to the local market to be sold for account of the tenant, deducting from the net result of such sales the value of the rubber agreed upon as rent of the *estradas*.

(2) The rubber must be delivered to the proprietor at

fixed prices, calculated at from two-thirds to three-fourths of the prices ruling at Pará or Manáos.

(3) The rubber must be delivered to the proprietor, who sends it to the local market, paying all freight and other charges, deducting for himself 15 per cent., more or less, as commission and paying the remaining 85 per cent. of the net proceeds of sale to the *seringuero*. In the lower parts of the Amazon the proprietors who rent out their *estradas* insist on all the rubber being delivered weekly, when accounts are made up; but in the more distant regions accounts are made up once a year, *i.e.*, at the end of each *saíra*. The average amount of fine rubber which can be produced by a good *seringuero* in any ordinary *seringal* is roughly about 400 kilos per season, of which, perhaps, one-fifth will be *sernamby*, so that the *patrão* of a moderate-sized *seringal* should receive quite a large amount of fine rubber. This amount is at times considerably exceeded, especially when new districts and virgin trees are first tapped; but through the Valley it is probably above and not below the average return per tapper.

Sernamby is packed in sacks, barrels, or cases, and, as a rule, contains a large percentage of moisture and foreign matter, which increase its weight. This is done by the actual *seringuero* in order to inflate the amount allowed him for purchases by the *patrão*, or other buyer, for the *sernamby* is always considered by the *seringuero* to be his perquisite and is delivered to the *patrão* on the understanding that he is allowed to purchase its value in spirits, tobacco, or any other thing he may desire. It is not sent to the market for the *patrão's* account, but is the absolute property of the *seringuero*, who takes all the risks of profit or loss.

All rubber delivered by the *seringuero* is subject to a tax ranging from 10 per cent. to 20 per cent., according to its degree of freshness, freshly cured rubber losing from

15 per cent. to 20 per cent. of its weight during the first month, after which the proportion decreases, until at the end of three or four months it is supposed to have lost much of its surplus moisture. Much of this shrinkage occurs while in the hold of the river steamer, where, tightly packed with the rubber of other proprietors, it generates a considerable amount of heat, causing it to sweat; but were the rubber better prepared at the start, say, by some mechanical means, not only would it be healthier and pleasanter for the gatherer, but needless weight would be saved on the river freights, perhaps 20 per cent., and a better article sent to market.

The classification of the rubber by the buyers is another of the evils against which the industry has to contend. Such work is generally entrusted to employés who have but very few scruples, and who are allowed a variety of privileges which enable them to increase their small salaries at the expense of others. These "perqs" include such items as the sale of the sweepings from the floors after each classification, so that, as a matter of course, other rubber than sweepings is sold to the employé's gain and to the loss of the *seringuero* and *patrão* alike. Further than this, the employé in charge of the grading, in return for his privileges, is often governed by a tacit understanding with the purchasers, viz., to give them every possible profit by classifying falsely.

Before the rubber can be classified it is cut in halves, and if the *pelle* is equal from core to outer skin and is thoroughly elastic, it is known as "fine." When a *pelle* contains parts which are spongy, due to the presence of latex which had coagulated before being smoked, these are cut out with large pieces of fine attached to them, and are classed as *entre fina*, being paid for at about 2d. per lb. less than fine. *Sernamby*, as has already been stated, con-

sists of scraps, drippings from the trees, &c., and is, or was, paid for at about 1s. 10½d. to 2s. per kilo less than the price realized by fine in Manáos, and 2s. 3d. to 2s. 6d. less than the price ruling for that quality in Pará. At present values, of course, the difference is not so marked.

It is a well-known fact in the trade that the inferior grades allow the *aviador*, or shipper, a much bigger margin of profit than "fine rubber," and it is for this reason that it is to their advantage, when making up the account sales for their clients, to greatly increase the real percentage of inferior rubber in a shipment of "fine" received from the rivers. Cases have come under my personal observation of shipments of fine rubber being received from Matto Grosso when over two years old, and which were further embarked on the river steamer perfectly dry. I attended to see them weighed and classified, unknown to the *aviador*, and out of one shipment of many tons, less than 50 kilos of inferior grades were cut out; and yet, when the account sales were received by the vendor, there was a supposed shrinkage of 12½ per cent., and more than 2,300 kilos of inferior grades were shown as having been encountered. Again, I ask, what industry, in these competitive days of rubber production, can expect to survive with such a mill-stone round its neck?

The vendor, on my representations and advice, protested, but an extract from the classification book kept by the man in charge of the weighing and grading room, and which, of course, purported to be the correct weights of the shipment, was all the satisfaction given to him. This partly explains, perhaps, why some commercial houses in Manáos and Pará are enabled to tide over bad *zafra*s covering several years, while the *patrão* and *seringuero* are on the verge of chronic ruin and starvation.

The actual *patrao* or *aviado*, when commencing business,

tries his hardest, in some cases, to pay his debts on as early an occasion as possible; but he soon falls into the general rule of the Amazon, which is to get as much credit as possible, and pass a comfortable and easy life when he can, regardless of what the future has in store for his wife and family, or other dependants, at his decease.

Even with a fairly honest *patrão*, this state of lethargy begins with the recognition that once he has been given credit, the weights and classification of his rubber depend upon the *aviadores*, who generally see to it that they obtain huge profits from merchandise and rubber, while keeping the *aviado* in debt. Another reason which influences him is that he, in his turn (often a case of being between the devil and the deep sea), has to depend upon his *seringuero*, who in many cases sells part of their rubber (*i.e.*, the *patrão's*) to *regatoes*, who form a class of travelling traders, or really pedlars (often nothing better than receivers of stolen property, if not actual inciters to steal), moving about the rivers in large canoes, bartering liquor and cheap jewellery, gaudy cloths, &c., in exchange for rubber. Some *seringueiros*, either from this cause, laziness or sickness, will deliver little or no rubber at all, enslaving themselves still more, it is true, but at the same time such conduct assists to plunge their *patrões* into gradual but certain ruin and does considerable harm to the industry as a whole.

The credit given to both *patrão* and *seringuero* carries with it much risk, since it is based, owing to the system of the industry, mainly on the confidence in persons without security, generally unknown apparently, and at times dishonest. All this, coupled with the distance, costs, and the powerlessness of local authorities against armed resistance, if it comes to a matter of legally recovering bad debts, renders the net profits very uncertain. From beginning to end, therefore, the whole system is rotten and unsatisfactory.

It is to be hoped, therefore, for the good of Brazil, that these unsatisfactory elements can be removed and the sounder and more honest houses and individuals brought to the front and their numbers added to. Once it is seen that honesty pays best, a better class of man will go into the trade, and so in a short time the ruffians, like the pirates and smugglers in the past, will be remembered only on paper. It has been attempted, but has always resulted in a crop of assassinations, and generally in the escape of the actual culprits, the cause of all the trouble. Thus it will be easily understood that the exploitations of rubber in the Amazon is carried on by methods which leave much to be desired; and until radical reforms of labour, food supplies, cost and speed of transport, &c., are carried out, the industry cannot be expected to flourish against the East.

Without going further into details regarding the daily routine of the life on the Brazilian *seringals*, what is said throughout the pages in this book will enable the reader to form a general idea of the system under which the rubber is produced; so leaving the subject here for a time, it will be well to consider Eastern plantation methods and compare them with those *at present* in vogue up the Amazon. I italicize the words "*at present*," firmly believing that a change for the better can and will take place before long.

CHAPTER III.

EASTERN PLANTATION⁴.

It is the opinion of many rubber critics, especially those interested in plantations in the East, that Brazil cannot continue to successfully compete with her Oriental rival. Such people assert in some instances that the superiority of the Amazonian Hard Fine exists only in the imagination, whilst others will tell you that manufacturers use more plantation than they care to admit, and only favour the Amazon product in order to discredit its rival and keep down prices. All this time, however, as explained in Chapter V, it has been recognized, even by the Rubber Growers' Association, that the present methods of curing and coagulating the rubber in the East can be improved upon, and all are busily engaged in discussing how this is to be done. There is a movement to abolish factory methods as at present carried on (in the East), and many planters are allowing substantial amounts for depreciation of their present machinery preparatory to scrapping it for an improved method still to be decided upon. Many estates, even previous to the outbreak of hostilities in Europe, had already found it advisable to restrict tapping in order to allow their hitherto heavily bled trees to recover and form new bark, as otherwise the rate of their bark renewal was likely to prove insufficient, a fact that the much wider planting now advocated was also expected to remedy, since the larger crowns developed by more widely planted trees encouraged

them to re-form their bark more quickly and to a greater thickness than is the case with those trees more closely planted.*

Readers of the reports of the principal rubber companies in the East must be struck by the note of despondency apparent in all but the best-managed or most favourably situated properties, and even they have found the system of a four years' bark renewal insufficient, and are advising the resting of large areas; whilst at the same time the number of trees per acre are reported as being reduced in practice as well as in theory.

Some Eastern estates (mainly in Malaya), whose planted areas are valued in their books at £25 per acre, if not at a lower figure, have been able to produce an average of 250 lb. (some say up to 600 lb.) per acre at all-in costs in the neighbourhood of 1s. 2d., or less; and so it is (or was) thought that when similar trees are fully grown they will also

* At the commencement of the paper which I read at the (1914) London Rubber Congress on the "Manuring of Rubber," I reminded those present that during the discussion which followed Dr. Lierke's paper on the same subject at the 1911 Congress, I maintained "that both in the planting and the manuring of the trees the main object to be attained was to have a fewer number of trees of larger girth rather than a greater number of a comparatively small diameter, and therefore with a smaller area of bark to each tree. At that time the tendency was to plant trees as close together as 400 to the acre, with the idea, I believe, of thinning them out in time until they stood at only 200 to the acre, that is to say, about 12 by 18 ft. apart; to-day (*i.e.*, in July, 1914) I understand that those in whose policy I have the most confidence are discussing such distances as 18 by 24 ft., 24 by 24 ft., and even 30 by 30 ft., giving 100, 75, and 48, or 50 trees only to the acre." This I urge is due to planters finding that not only is the larger girth of the tree an advantage, but also, on account of the more wide-spreading crown of leaves at the top, they obtain larger yields from the wider planted areas. The greater space, I understand, is necessary to enable the trees to re-form their bark more quickly and perfectly than can be done if the trees are planted closely together and have to struggle, not only to flourish and expand as we want them to do, but for their very existence; without sufficient space even at the best of times they have no room for their foliage to develop in the open air.—ED.

be able to produce 300, 400, and perhaps even 500 lb. per acre in their best seasons, even when they stand only 100, 150, or 200 to the acre.* These are, however, mainly estimates based upon very favoured properties, and are not representative of the general Eastern plantations, whose capitalization (more generally) is nearer £80 per acre; whilst rumour values others as high as £200 and even £250 per acre, and such high costs must be taken into consideration when discussing the possibility of an over-production of rubber in the future; for think what could be done in Brazil in the way of clearing and draining her rubber forests if only £20 or £25 per acre was spent, ranging over a term of fifty years or more.

The British Rubber Growers' Association, realizing the imminence of over-production and the present serious position in the East, is doing all it can to push forward many new uses for rubber whilst developing those that already exist. Anyone who visited the recent Rubber Exhibition must have come away impressed with the possibilities of new outlets for manufactured rubber and the multiplicity of uses to which rubber articles are now put in the social, industrial, and scientific world. If this demand can be increased and so enabled to keep up with increased supplies, well and good; otherwise, as already suggested, East and West will have to put their heads together and evolve a way between them out of the difficulty of an over-production and the consequent unremunerative prices. Meanwhile, it

* According to *Grenier's Rubber News*, of Kuala Lumpur, F.M.S., seventeen estates in Malaya, which tapped 16,094 acres in 1914, actually secured an average yield of 333 lb. per acre, the extremes being 240 lb. and 440 lb. per acre. Probably none of these estates would have given these particulars had the results been unsatisfactory; but be that as it may, the above is of interest as showing what a substantial number of estates in Malay have actually secured as to yields, and that, too, be it remembered, with expenses cut down to a minimum for five months out of the twelve —ED.

would be interesting to know what proportion of the £70,000,000 to £100,000,000 said to have been invested in the British plantation rubber industry has been spent on the machinery which the planters, as a result of conferences between themselves as well as with manufacturers, are becoming convinced that they will have to relegate to the scrap heap, and in doing so, of course, will further add to the cost of Eastern as compared with that of Western rubber.

It is known that the East alone will shortly have over a million acres of rubber trees at a tappable age; the returns published in the annual rubber market reports issued for 1914 being as under:—

		1914		1913	
Malaya	...	500,000	...	500,000	acres
Ceylon	...	220,000	...	220,000	„
Borneo	...	20,000	...	20,000	„
Dutch East Indies	...	400,000	...	400,000	„
India and Burma	...	65,000	...	45,000	„
		<u>1,205,000</u>		<u>1,185,000</u>	„

And besides the above there are the English, German, and other plantations in Africa, the West Indies, and elsewhere.

Presuming that each acre contained only 100 trees, the maximum number per acre at which it is now recognized that the trees will thrive, this (1914) area of 1,200,000 acres should produce, at an average of $2\frac{1}{2}$ lb. per tree, a total of over 130,000 tons, so that with a liberal reduction for mishaps to the companies as well as to the trees, a total of 100,000 tons of rubber will soon be reached.*

* Akers, of course, estimates for 1919 a possible output of 130,000 tons for Malaya alone, and of 219,000 tons for the following three centres, say:—

ESTIMATED EXPORTATION IN 1919.

Malaya	...	...	...	...	130,000 tons
Ceylon	...	...	...	...	45,000 „
Dutch East Indies	...	...	...	...	44,000 „
					<u>219,000 „</u>
		Total	...	...

[ED.].

Many plantations, however, still contain 200 trees and more to the acre, and while the trees are young it is possible to profitably tap them on such plantations; but in the course of a very few years probably large numbers of these trees will no longer be of any value, so that outputs and profits are bound to be very seriously affected on all those estates containing more than 100 or 120 trees to the acre, apart from the question of costs *versus* profits (or losses) when prices go lower.

Combinations among plantation companies formed to organize and reduce outputs may be assisted by unavoidable decreases, such as (1) insolvency and dissolution of small estates; (2) replanting or thinning out on all estates where the trees are cramped; (3) the necessity of allowing trees to rest for bark renewal, &c.; (4) decreases in selling prices which would prevent profitable rubber growing, and certainly restrict output. Most critics base their calculations, when estimating future production, on the assumption that Brazil will produce less than 30,000 tons in 1914, and that by 1915, against an estimated consumption of 140,000 to 150,000 tons, she will provide less than 30,000 tons; other sources say about 10,000, and the East the remainder. By such folks *we are told that already it no longer pays to extract the wild rubber, and under present conditions and low prices the Amazon output, as well as that from elsewhere, must, of a necessity, decrease, and in many cases cease.* In face of such an assertion it would be useful to ascertain how many of the Eastern planters, or their directors, really believe that they can continue to run their estates up to and beyond 1919 at a profit. Look at the reports for such information and note how non-committal they all are. The persons responsible for them admit that they are not sanguine of increased prices, though "all interested in the rubber trade *hope* that prices will improve." Surely, when making such statements

the speakers cannot really understand what this means or they are wilfully shutting their eyes to what the future has in store for them. With better prices (and increased yields) they think they would undoubtedly pay better dividends, even with higher wages and other costs increased; but they must realize that better prices would also re-establish the Amazon rubber (which has still to receive its knock-out blow even to force it to lay low temporarily). We are told that Brazil will produce less rubber year by year, and so as early as 1915 or 1916 very little wild rubber can be extracted owing to its unprofitableness; this is purely a matter of speculation.

It is easy to say that the estimated increased outputs from plantation sources, counterbalanced by hoped-for decreases on the part of rivals, will maintain prices at a level of 3s. for Fine Pará, with plantation close behind at 2s. 6d.; but in view of the increased activities on the Amazon (which would be accelerated with rising prices) a continuance of low prices must be looked for; whilst in order that the majority of estates can continue to work with any degree of profit, prices would have to be maintained at not less than 2s. 6d. for the best qualities of plantation rubber, and the planters cannot expect to do this if the increases in planted area and yields continue and are even being added to.

Meanwhile, if prices are maintained at present low rates, or further decrease, the Amazon people might give up the fight for a year or two, only to again enter the market when values were remunerative; but quite apart from the reforms and changes advocated in this book, reorganization and economies among the most conservative of Brazilians will probably show the Western producer that he can reduce his costs sufficiently to enable him to sell at 2s.; or even 1s. 6d. per lb. if pushed to do so; and what can be done at a pinch with Brazilian rubber, when its extraction and

preparation constitutes but a secondary industry along the Amazon, no one can yet tell.

If the East, therefore, persists in increasing her outputs without thought for the future, there seems every reason to expect her to put out at least 160,000 tons in 1917; and if the increase in consumption is maintained, only 170,000 to 180,000 tons of first-class raw rubber (*i.e.*, other than reclaimed, fillers, &c.) will be required; therefore, if over-production is to be avoided, Brazil and other sources must contribute not more than 20,000 tons. Of course, no one who knows Brazil and her people can reasonably believe that this will be so, and so it behoves the Eastern planters to seek a remedy which must cost little, be effective, and ensure certain profits to the sound companies.

Writing to the *Financier* some little time ago, the well-known authority, Mr. C. C. Malet, said: "By 1917, when all the planted areas will be brought into bearing, I do not see what is to prevent the total crop of plantation reaching about 170,000 tons, under present systems of tapping, with the older areas bringing in their 500 and 600 lb. per acre, and with the remains of Pará rubber, a '*possible 28,000 tons*' (the italics are mine), we have a prospective production of 200,000 tons." Continuing, he further says: "*This must mean that the producers will have to hunt for their markets; the market will no longer come to them*, so that the sooner we form a 'Thirty Committee,' as in Ceylon, the better . . . with a view not merely to discovering new markets, but studying more economical methods of production, and if possible to standardize the output as well. This may mean the scrapping of our costly machinery and the installation of some simple apparatus which will convert the latex into one quality of rubber in one act, &c."

If Mr. Malet sounds this note of warning expecting a decrease in output from Brazil, the situation of the Eastern

industry must be critical indeed, harassed, as it owns to be, by the diversity in quality of its product. How much more serious it must be is very apparent if the possible output of the superior Hard Fine Pará is considered when those 300,000,000 trees, now buried away in the Brazilian forests, are reached, and being worked as a side industry. Referring to a recent pamphlet of Messrs. Zorn and Leigh-Hunt, I find that they estimate an output of 147,000 tons plantation in 1917, plus 32,000 from Brazil, and 2,500 wild rubber from other sources. Consumption is estimated at 179,000 tons, with total output 181,500, showing an estimated over-production of 2,500 tons even in this case; but if Brazil produced 50,000 tons of improved quality rubber instead of 32,000 tons only, what would be the result on the Eastern industry?

Whether the estimated production of Messrs. Zorn and Leigh-Hunt or that of Mr. C. C. Malet be accepted, there cannot be any doubt that planters must restrict their outputs, and that such restricted outputs by Eastern estates at present or future low prices must mean curtailed, if not invisible profits to most, and perhaps ruin to some of them, certainly all those whose all-in costs exceed 1s. 6d., and whose capital charges are excessive.

Mr. Malet suggests two methods for restricting output: one calling for tapping to be carried out every alternate day, as in the Amazon, thus reducing output by half, and incidentally reducing labour forces, &c., or the abandoning of large areas for long periods without tapping and upkeep, and the keeping of estate staffs and labour to the lowest possible level. What the state, and consequent value, or absence of value, of such abandoned lands would be is easier to imagine than estimate. As stated elsewhere, when it comes to a question of East starving out West, or *vice versâ*, surely the Brazilian forests will even benefit by being left

completely alone, whilst the estates in the East would soon deteriorate beyond repair.

I would maintain that even if Brazil's yields decrease and other wild rubbers entirely disappeared, the Eastern planters must restrict outputs in order to prevent over-production and the reduction of values below a profitable level. Viewing the future with intelligence and a desire to see fair competition and healthy rivalry, critics must in time acknowledge that there is only room in the East for those whose capitalization values per acre are really moderate. No attempt at combination, restriction of output, or other protective measures can be possible until all but the really non-speculative and well-managed estates, whose all-in costs are small and whose capitalization is not excessive, are once and for all time driven out of existence.

The future of the rubber industry of the Orient is bound up in these measures and in co-operating with the West as to their combined output; for, although it seems to me that the 200,000 tons, which it is estimated that the East will produce in 1921, will never be reached, if such an output were possible it, at least, ought never to be permitted, otherwise the Eastern estates will lose more by unduly depressed prices than they can possibly gain by increased production.

CHAPTER IV.

EAST AND WEST.

ORGANIZED heavy outputs from the East in opposition to the Amazon would reduce prices below cost and cause more damage to the planters themselves than to their rivals; for, as stated elsewhere, *Tropical Life*, in its issue of December, 1913, called attention to a possible solution of the planters' (both East and West) difficulties, and offered very valuable suggestions, basing them on the Brazilian's ability to restrict output. Expressing doubt that the East will produce even 100,000 tons in 1920,* the writer of the article points out to us that "if there is one industry in which deferred crops are not only safe, but are actually improved in quality and increased in quantity by being kept back, it is that of the extraction of rubber, at least from *Hevea brasiliensis*. Not only is the capital invested in a well-managed rubber estate safer than in most agricultural industries when passing through periods of acute crisis, but delaying the crop is an advantage, not a drawback, and this fact enables us to advise that the output be curtailed and prices raised to any level desirable." The writer then goes

* The commonly accepted estimate is 200,000 tons. On this point it is interesting to note that, discussing the 1914 yield per acre in Malaya, *Grenier's Rubber News* showed that 16,094 acres tapped on 17 estates (all good yielders, perhaps, but not always well-known names) gave an average annual yield of 333 lb. per acre, the extremes being 240 lb. and 440 lb. per acre.

on to suggest that the Eastern planters in such an event should restrict their output by suspending tapping operations. The consumers having become accustomed to use up, say, 140,000 tons by 1920, would, on finding the supply of the raw article curtailed, have to pay much higher prices. He points out that the planters would be able to send up prices to any figure desirable, and shows that it would be much better to sell 10,000 tons at 20s. per lb. than 100,000 tons at 2s., simply because the aggregate all-in charges on 100,000 tons would be much heavier than those on 10,000.

Such suggestions are of enormous value and should be noted by every planter, for if the estimated supply from the East should reach 200,000 tons by 1921, there must be a large overproduction long before then, and I think that it would be far better for all concerned if, instead of suddenly curtailing the output in the future, planters should start now. The planting and opening out of new areas must be restricted, and all attempts to smother and discredit the Brazilian rubber must be discontinued, as they have so far signally failed and only tend to excite the Western to further effort instead of discouraging him. Indolent and easy-going as he may be, the Latin American can and does become as stubborn and tenacious as a mule when least expected to do so, and far from producing only 20,000 or so tons in 1920, there is little doubt that with the awakening of the Amazon and the organization of its industry, coupled with the spur of the East, an increased output might appear from Brazil of a *quality and uniformity as yet unattained*, and all because of a little want of tact, or of knowledge of this adversary "up against the East."

It is from this that the planters have everything to fear. If the Amazon people, or those financing them, once thoroughly realize their danger, and the way out of it, directly even that they find that they can not only do without

the truck system, which has almost ruined their industry, but will prosper by its absence, they will at once set to work to put their house in order, and so reduce their all-in costs quite 50 per cent., say to 1s. 2d. per lb., whilst increasing their output and quality until the consumer will have at his disposal the superior wild product at the same price as (or probably below) that of the very best qualities of plantation.

It is true that Brazil could only send to market 37,000 tons for the year 1914 (including 10,000 caucho), while the East sent nearly (if not quite) 65,000 tons of all qualities. With an increase in demand, therefore, manufacturers were obliged to buy plantation rubber freely, even if they did not like doing so, leaving, on account of the embargo, Brazilian kinds since August for America and elsewhere; but when manufacturers can rely upon a larger amount of perfect wild Pará, will they, price for price, prefer it to the East? The London Rubber Growers' Association say "No"; but then, is their answer free from prejudice and entirely correct? I, for one, doubt it. What, therefore, will happen when Hard Fine in the aggregate is placed on the market at a price below the cost of the bulk of the first latex rubber from the East, *kismet* alone can tell. The Brazilian *seringuero* and all who live by the rubber industry have now learned that life has some charms without expensive silks, liquors, perfumes, and jewellery. They have learned that plain boiled mandioca, bananas, rice, and beans are far more palatable and wholesome than inferior American flour for costly bread, unwholesome and full of weevils, and it is these changes which will enable them again to take first place in quantity and quality.

Looking at the position with absolute impartiality, but convinced of a very formidable increase in competition from the West, I cannot imagine any other hope for the East than standardization of quality and retention of surplus latex in the trees. The output of every inferior competitive grade

of plantation rubber must be greatly curtailed, and no effort spared to secure a uniform product as near the Brazilian standard as possible; for it can be taken for granted that, especially with a smaller output, the percentage of *entre fina* and *sernamby* Brazilian rubber will decrease.

To ensure a rubber close to Pará in standard, they must waste no more time in discovering tapping methods which will increase the flow of latex from their trees, as thereby they sacrifice quality of latex to quantity, whereas what the East requires is less latex and better rubber. Planters *must* decide to be satisfied with less latex from their trees, and this alone would go a long way towards improving the quality of their output. They must abolish the present (or past) milling that much of the plantation rubber has been subjected to, and smoke-cure their output in a manner similar to that of the *seringuero*, whilst handling it as little as possible before it comes to market.

Lessening the demand for latex upon each tree would ensure a better product, and the output in quantity of raw rubber would be reduced. This reduction of output alone would be beneficial to the already overworked trees; a superior quality of rubber would be the result, and it would bring better prices. If uniformity of tapping methods were then insisted upon it would be easy to standardize the quality of the exported article, and a suitable method of curing could be easily ascertained and adopted to give a product similar to Hard Fine.

Standardization alone, however, whilst placing plantation rubber in a better position to meet competition as regards quality, will not avail much unless drastic measures for restricting the output are arrived at both in the East and in the West. Of what avail can it be to continue to over-tap existing trees (much less to add to their number) which can never produce anything superior to the wild rubber from

the Amazon, when the latter has 300,000,000 full-grown virgin forest trees of the best class at her disposal? And these trees, too, are in a region which is bound to be developed into one of the richest in the world, for it is not conceivable that the Amazon is always going to remain in darkness, nor that her rubber is always going to remain her sole source of revenue from Pará to Peru.

It is for the Eastern planters quickly to make up their minds as to what they intend to do. On the one hand they have the chance of restricting their output of latex and maintaining prices, thus allowing the Brazilian a share of the world's trade. On the other hand, if they continue in their attempts to drive the fine hard Pará from the market, the Amazon people would have to stop producing rubber as the prime and even the sole industry, and turn their attention to reducing their living and other expenses by growing food-stuffs both to feed themselves and to sell to others. This the Eastern estates could not do. Once this was established along the Amazon, tapping operations would again be resumed, and their competition might then result in the ruin of all but the very strongest of the Eastern rubber estates.

CHAPTER V.

NEW METHODS FOR PREPARING RUBBER.

By THE EDITOR.

BEFORE plunging into Mr. Woodroffe's next chapter, I would like to devote this one to some preliminary remarks, since the author was unable to be present at the (1914) London Rubber Exhibition and so secure the information necessary to do so himself. According to the latest reports, it seems as if the East is beginning to recognize the necessity of adopting Western methods, if only to ensure having a reliable method for the standardization of their product, since so much depends on the output being reliable, even in quality and strength. In face of this the prominent position occupied by the various methods suggested for smoke-curing the rubber was particularly noticeable at the above (1914) Rubber Exhibition, where they (at any rate, to my mind) formed the chief centre of attention in the Agricultural Hall. "Passing through the pavilion (on the Ceylon stand)," I wrote at the time, "it seemed for the moment as if we were once again in Brazil, for we suddenly found ourselves surrounded with 'lumps' of rubber, varying in shape, but of that well-known appearance and smell that one associates with Latin America; we, however, found that the samples were only those cured by the various modern processes now met with on all sides. The Mendes, Cerquiero Pinto, or Da Costa (the last is made

in Manchester) from Brazil, Byrne and Wickham in London, and the Agar (made up at the Tyne), Reid-Till, Gollidge, Colombo Commercial, Pitiakande, and others in Ceylon. Rubber prepared by one or other of these processes were distributed throughout the Hall in rolls, sheets, blocks, or other shapes, according to the fancy or convenience of the curer or the machine used. Samples cured by all these processes were shown side by side on the same counter, including a genuine Brazilian *pelle* cut in half for comparison with the Ceylon product, so that those visiting the Exhibition could examine the interior and discuss its merits."

Six months later, Messrs. Gow, Wilson and Stanton, Ltd., the rubber brokers, in their annual report (issued January, 1915) of the Rubber Market, called attention to the modification in the methods of preparing rubber on estates owing to the considerable discount at which plantation rubber continued to sell. "The higher price of hard Pará," they added, "has been attributed to the fact that the rubber is smoke-cured, and this has caused a considerable increase in the proportion of plantation rubber made in the form of smoked sheet, it being considered advisable to approximate as closely as possible to the Brazilian method." "Smoked ribbed sheets have continued to command a premium on the price of *crêpe*," reported Messrs. S. Figgis and Co., in their annual report issued at the same time.

Regarding the advantages of smoke-cured rubber over other systems, the chief one offered to the Brazilian *seringueiro* by any or all of the various processes on the market would lie in his still being able to prepare his rubber in his own way, but without his face, and especially his eyes, having to come into contact with the smoke in the unhealthy, or certainly in the unpleasant manner described on pp. 43, 98, and 199; at the same time the rubber would still be turned out by the ton, or by hundreds of tons, "to

type," as at present. This is most important, for were Brazil to lose her present good name for absolute reliability of evenness of output that she now enjoys, then indeed it would lose much, quite half its goodwill, and more than its margin of profit . . . when a profit is really made. This is borne out by papers in the East emphasizing the necessity of the Orient turning out its total production "to type," instead of sending the hundred and one kinds that they have been doing since 1908. The *Indian Planters' Gazette* of Calcutta, for instance, as far back as December, 1913 (when discussing the report of the Standardization Committee of the Rubber Growers' Association of London, which it did in a way that drove home the fact that the East, if it means to successfully compete with the West, must turn out its rubber "to type" and not at the dictates of the individual planter's "fancy"), told its readers: "A question that is agitating and influencing the market is whether plantation rubber is, on its merits, a serious rival to wild rubber. It has been asserted that it is not as lasting, and therefore the manufactures subjected to hard wear are better made of the wild product. . . . One method of raising the price of rubber is to put on the market a more standardized article. Purchasers are always apt to unduly lower prices when there is uncertainty in the grade of the article they are buying, and there is a complaint in the market that, owing to greater variations in the method of manufacturing plantation than wild rubber, there is more reliance to be placed on the latter. . . . Standardizing would therefore tend to similarity of treatment, and a restoration of confidence (in plantation kinds) in the minds of purchasers." Turn to the report itself and it confirms this by saying: "We consider that the evidence which has been put before us clearly proves that variability of a substantial character exists (*i.e.*, in Eastern plantation kinds) and . . .

prevents manufacturers from using our product to the extent they would if some guarantee of quality could be given to counteract this variability." Again, Mr. T. C. Owen, well known among the leaders of the Eastern rubber world, told a meeting held about that date (October, 1913) that "One of the disadvantages from which plantation rubber is at present suffering was that the manufacturer was more certain of getting exactly what he required when he bought fine Pará than he was when he bought plantation kinds." In face of all these warnings there is little wonder that last year (1914) was spent by those interested in plantation rubber in trying to devise some mechanical method whereby their rubber could be standardized so that, be it one ton or one thousand tons that is turned out, be it one estate or fifty exporting the rubber, all would be prepared "to type," so that the manufacturer would know what to expect, and could rely upon getting what he wants. Not only is it necessary for the rubber to be standardized, but the quality must be *sans pareil*, *sans reproche*, and the apparatus chosen able to turn out "cwts." per day against the *seringuero's* "lbs."

These opinions could be continued *ad infinitum*, and I could also include the warnings issued against the excessive "milling" of rubber on the Eastern estates to the detriment of its nerve and strength,* but I have surely said enough to make Brazil's eyes sparkle with pleasure when she realizes the high value put on her rubber by those against whom she is in competition when it comes to a question of selling the product. Elsewhere in this book I include prices obtained month by month during 1914, by both kinds,

* See, for instance, "Unbiased's" letters in *Tropical Life* for June, 1914, p. 105, and August, 1914, p. 147, quoting the opinions of Mr. Lyne, Director of Agriculture, Ceylon, and Mr. Alexander Johnson, General Manager, North British Rubber Co., Edinburgh, regarding the excessive milling of plantation rubber.

together with a reproduction of the chart issued by Messrs. Hale and Son (see p. 371), showing prices realized during the last twelve years; but in calculating these comparative values it is as well to remember that whilst Eastern rubber contains, as a rule, very little, in fact hardly any, moisture, the Amazon *pelle* has a substantial quantity. That the East is fully aware of this was shown by Dr. Schidrowitz, a giant (as regards reputation) in London, and out East, when giving his evidence before the Standardization Committee of the Rubber Growers' Association already referred to, "On the present basis of price of rubber," he said in answer to Question 36, on p. 36 of the Report, "taking spot 'fine hard' at 3s. 7d. and average first latex at 2s. 2d., and allowing for a factory loss of 20 per cent. in the case of the Brazilian article, and if we assume that price is equivalent to quality, then average first latex, on the basis of a standard index figure of 100 for 'fine hard' washed and dry, is only about 50." In plain English, this means that "fine hard" finally costs the manufacturers exactly twice as much as average first latex plantation rubber, in spite of its originally rough-and-ready preparation. Dr. Schidrowitz, by the way, was by far the principal witness, for out of 137 questions put, he received and answered fifty.

Coming now to the question as to which kind of raw rubber receives the largest amount of approval, the following notes from the United States are worthy of attention by West and East alike. Neither Mr. Henry C. Pearson, editor of the New York rubber trade journal, the *India-Rubber World*, nor the paper itself, need any introduction to the class of reader who will be interested in this book. This being so, no apology is needed for the introduction at this stage of the opinion of such an authority as expressed in a two-page article published in the January (1915) issue of his journal by Mr. Pearson, under the heading of "What

Manufacturers want in Crude Rubber," when he tells us that in "the first place, they want rubber, plenty of it, all the time. They want it at a fair price, the same price that their neighbours pay. They desire clean rubber, but can use dirty rubber at a price that will pay them to clean it. The general qualities called for are resilience, impermeability and toughness. For example: In motor tyres impermeability and toughness are necessary; in clothing, impermeability and plasticity; in wire covering, the same; but in rubber thread, elastic bands and goods of that type, elasticity is also required. An extremely resilient crude rubber is just as adaptable for goods that call for only plasticity and impermeability, and some time in the future such a standard high grade will be evolved and used for all of the varied lines that now comprise rubber manufacture.

"In the process of manufacture, rubber is first washed, then dried and then massed—the last to render it homogeneous and ready to take up the sulphur, metallic oxides and the like that go to make up the compound. Plantation rubber will eventually render washing and drying unnecessary, for clean, dry rubber will be produced. It is possible, too, that so homogeneous a product will be evolved that massing will also be unnecessary. The last word upon ideal coagulation has not by any means been said. How latex is coagulated—whether by acetic acid or smoke—does not interest the user of the rubber. His interest lies in the cleanliness, nerve and uniformity of the product.

"That the rubber manufacturers desire clean rubber cannot be for a moment doubted. The fact that they have in the past been forced to install great washing plants to remove bark, sand and a variety of deleterious substances, and that they still use such machinery, does not argue that they would not be glad to receive all kinds of rubber so clean that factory washing would be superfluous. The cost of

washing has in the past added at least half a cent a pound to the price of the rubber used by them. Taking all wild rubber, including bastard gums, at 200,000,000 lb., the cost to them would be \$1,000,000 annually. Then there is the shrinkage from moisture and dirt, much of the cost of which often falls upon the manufacturer. Beyond this is the freight charge on the water and dirt, which, at the high rates that have heretofore obtained from the African and Amazonian sources of supply, is a great annual loss to the rubber trade. The trade would, therefore, welcome the abatement of these unnecessary charges, an abatement that plantation rubber has already begun to put in force.

“An urgent necessity is some form of packing that shall at once be secure, cleanly and economical. In considering this, however, there comes the important question of the physical shape of the rubber to be packed. Shall it be in the form of balls or *pelles*, sheets, slabs, sausages or what? Wild rubber has come in all of these shapes, and more. Is there any reason for accepting any one of these forms as embodying the best ideas? They all have their advocates, but they are without exception those who gather it in the jungle and who find it most convenient to make the shapes in which they send their rubber.

“The theft of rubber is common. In the past, rubber gatherers, importers and manufacturers have all been sufferers. On the part of manufacturers many attempts have been made to bring the thieves to justice, but the difficulty in establishing title to *pelles* and chunks* that are hardly distinguishable one from the other has usually resulted in failure. With uniform shape, plantation brands, adequate packing and direct shipment from plantation to factory, most of this thieving would be impossible, or at least easily

* The same as with printers' type, as those who have been connected with the Press in the Tropics soon learn to their cost.—ED.

detected. Once in the factory, the manufacturer is able to guard his rubber pretty safely. There is a movement, inaugurated by the Rubber Club of America, to destroy the market for stolen rubber by invoking the assistance of manufacturers and the wholesale handlers of rubber waste. These firms not only refuse to handle lots of rubber offered by those who cannot show a clear title to the goods, but they also report any such offerings to the Rubber Club. Such procedure will in time, no doubt, reduce rubber stealing to a minimum. Perhaps it is the rubber planter who will in the next decade suffer most from rubber thieves. Certain it is that if once the thrifty peasants of the Middle East ever establish every man on his own little plantation of Hevea, some of his richer neighbours' rubber will be likely to swell the product of his own trees.

"The *pelle* is not capable of being packed without waste. It holds moisture a long time and it must be soaked in hot water and cut open before the machines can handle it. Small balls and sausages gather much dirt, leave much of their surface open to oxidization, and are easily stolen. Sheets like the *crêpe* of commerce have all to be pulled apart before use, and a pound or two torn from one end is not missed. It would seem, therefore, that some form having always standard dimensions, and branded with the name of the plantation, would be a step in advance. Rubber in such form would be hard to steal, or hard to dispose of when stolen, would pack without waste of space, and would be exceedingly easy to handle in weighing. As for the wooden boxes, planed boards should be always used."

This concluding sentence is constantly being driven home by the buyers, whether brokers or manufacturers. Every annual rubber report since the boom has, I suppose, contained a paragraph to that effect, and those issued in January, 1915, proved no exception to the rule.

On no point, except perhaps the question of tapping methods, have rubber men been more at variance at times than over the preparation of the rubber in order to save room and hence freight and charges in transit, and also to minimize the loss by oxidation and the consequent deterioration of the exposed surface of the rubber, either in transit or when stored away in a warehouse. This means, in a nutshell, is the blocking of rubber an advantage or a drawback? To those interested in the controversy the following notes may come in useful, so I include them for what they are worth.

With regard to the chief objections advanced against blocks, viz., the facility with which adulterants and make-weights can be included, and the extra trouble and expense these more unwieldy lumps cause to the manufacturers when cutting them up for washing and use, those who urge these drawbacks have only to think what prime favourites "Lana-dron Estate" blocks are from the East, and the *pelles* always have been from the West. With the first, the rubber is so clear that you can see through it sufficiently to see at a glance if any foreign body (even a small stone) had been included or slipped in by chance, whilst the custom of always cutting open the Brazilian *pelles* or other "lumps" at once does away with any objection on that point. The query as to whether the blocks or *pelles* give more trouble to the manufacturers is not very important in face of the excellent prices and reputation the *pelles* have always enjoyed wherever rubber is used.

The blocking of rubber, on the other hand, has many advantages, viz.:—

(1) It enables the planter to turn out a neat, square, compact product, that saves time and therefore money in the handling on the estates, as well as in freight on the way to the consuming markets.

(2) Packed two, four, or more in a box, it offers the best resistance to splinters,* dirt, deterioration by exposure, or through accidents from salt or fresh water, or from the other cargo; whilst it is an excellent preventative to dishonest practices on the part of any one who has a weakness for slipping in make-weights. This in some centres would alone make blocks an advantage, as the most casual supervision could detect, by having the blocks and boxes first weighed apart, and then again after all the rubber has been packed, noting whether the final weight tallies with the first one. If a block was kept back the one in charge can see it more easily than an odd piece of crêpe or even blanket, which can be slipped round the body under the clothing; and if, on the other hand, make-weights have been introduced the scales would soon prove they were there.

(3) The pressure that the rubber itself in its shrinking brings upon the interior of a cubic block like the "Lana-dron" or on an Amazon *pelle* is also believed to benefit the rubber, and it certainly does so by keeping out the light and air, which go a long way to deteriorate the surface of rubber, thereby causing a loss in the weight to someone sooner or later.

(4) The blocks, when deeply branded, as they mostly are, discourage theft out on the estates or elsewhere, because if the name is cut away suspicion is at once aroused, and if the name is still there and the would-be seller had no right with the rubber, he stands convicted on sight.

(5) Whether or not "milling" the rubber is continued, need not alter the query as to what shape the final product can be made to save deterioration, freight, and handling. Crêpe sheets, to hasten drying, are the same as the thin

* It is worthy of note how year after year the brokers here and the Government experts in the Colonies warn shippers against allowing splinters to get into the rubber through using unplanned cases.

skins that go to make up the *pelle*, and it is only the difference in the number of skins or layers, according to their thickness, that goes to make up the whole. Whether some day the moisture can be expelled from the latex in bulk, and then the rubber pressed like cheeses, remains to be seen, but even then we shall still have a block to pack and ship. To my mind thin crêpe or sheet, that cannot be undone, is the most unattractive form (to the eye or the mind) to ship rubber in imaginable; good, firm blanket is pleasant to look at, but then it takes such a lot of room to pack. After all the block is only the blankets (in their turn made up of crêpe) pressed tight, and with less surface for exposure to light and air.

For some years past the question of the deterioration of raw rubber has been closely followed. I take it that we hear less about it to-day because since the motor-tyre has come upon us the rubber goes into use far more quickly than was the case before Rolls,* in 1896, drove a motor-car through the streets in defiance of the "red flag" regulations, which compelled all mechanically impelled vehicles to go so slowly that a man waving a red flag could walk on ahead and warn horse vehicles coming in the opposite direction.

In any case, I have a note, dated back in 1908, of the comparative analyses of some *Manihot* rubber, made by M. Schellmann in Paris, first of the rubber as and when received at the warehouse, and then later when it had lain there for six months. The results of these analyses showed that the percentage of insoluble matter had increased during the half-year from 3 per cent. to 27 per cent., and it was suggested at the time (to the manufacturer) that had this

* *i.e.*, the late Hon. Charles Rolls, who met his death under such tragic circumstances when flying at Bournemouth. The motor and flying world owe much to this pioneer, as was acknowledged by the Press from all parts of the world directly they learnt of his death.

rubber been blocked after being washed on receipt, the surface coming into contact with the air and light would have been minimized and the loss through deterioration much less.

Whilst on this subject of preparation, since elsewhere I have been eminently practical, may I include here a Christmas reverie that came to me about two years ago, when I was discussing the relative merits of cotton, coffee and cacao as plantation industries compared with rubber, and which I jotted down in the pages of my journal at the time, as follows :—

“ Unlike cacao, coffee, cotton, &c., the crop when ready need not be gathered, and furthermore, the trees benefit when this is not done, as the enforced rest strengthens them and, at the same time, improves the globules in the latex, and increases the yield when tapping is carried out later on. Again, with the other estates mentioned, those which produce fancy qualities cannot change the grade or make any alteration in the quality unless the whole estate is replanted; and even then, we believe, with cacao at least, local peculiarities of soil, or through hybridization or other causes, the beans would in time tend to revert to the very quality you wish to get away from. But with latex, once the trees are comfortable and well looked after, any kind of raw rubber can be turned out, the thinnest and whitest crêpe, or the finest ‘hard,’ so long as those handling the rubber know their work. This being so, and if buyers prefer smoked rubber in *pelles* with 10 per cent. to 25 per cent. of water thrown in, and are willing to pay 40 per cent. more money for such compared with the almost stone-dry Eastern kind, why not give it to them, especially as when prices are low, and importers want to hold up their rubber, the *pelles* alone can be relied on to last unimpaired in quality? The day the fashion changes so can your method of curing; meanwhile rubber made on the Amazon principle

costs less to cure and weighs more. One of these days the latex will be smoke-coagulated in bulk, and then be drawn out through a number of apertures or slits in the form of thin crêpe, carried through a tunnel-shaped shed long enough for it to be partially smoke-cured and toughened; at the end of this the strips of crêpe to the number of six, ten, twenty, or as desired, will be run through a pair of heavy rollers and emerge in the well-known blanket form. This, in its turn, will be caught up and carried along under fairly strong tension until, now edgewise, it reaches a rotating spindle round which it will be rolled as tightly and closely as possible until—lo! and behold—you have an unmistakable *pelle* as those from Brazil, made of a continuous strip of rubber tightly wound round and round (you would require fairly thick blanket to do this, in order to have the necessary strength) until about 56 lb. has been rolled off. The *pelle* is then replaced by another spindle and, removed from its own, is placed in a strongly made mould, lemon or other shape, inside, and left under heavy pressure long enough to ensure its being one compact whole, and, in every way, similar to and as good as its troublesome competitor from the West. All would be easy, simple, and labour saving, hence inexpensive. You pour in the latex at one end (say into one or other of the patent smoke-coagulating machines), and you hitch off the finished *pelle* at the other; between the two, except for turning on the smoke, or joining together a crêpe ribbon that had got ruptured *en route*, the less the rubber is touched by hand the cleaner and better the quality and the lower the cost."

In a less romantic strain, I went on, in the same article, to discuss what I should do if I had an estate out East and supplies threatened to overtake and leave the demand behind. This was a clear twelvemonth before Mr. Arthur Lampard (London's rubber oracle, whose speeches command a respect

in the rubber world similar to what Lord Rosebery's did, and still do, when he treats us to one in the social and political world) had prophesied that the plantation industry could turn out 180,000 tons per annum when the present acreage under plantation rubber comes into full bearing.

“When low prices are the rule for Eastern plantation (I go on to say) I do not consider the remedy to be difficult, much less an impossible one; it will neither add to the troubles of the manager, nor increase the expenses of the already overburdened finances. Far from adding to the directors' troubles, I believe, on the contrary, the remedy I am about to suggest will first of all lessen, and finally cause the total disappearance of the present anxiety. If this is so, the present crisis will have proved but a blessing in disguise. One thing, and one thing only is necessary, and that is co-operation on an organized basis between the various boards, especially those of the dominating syndicates.

“‘Standardize Eastern rubbers,’ clamours number one set of critics. ‘Sell through central agencies,’ implores a second. ‘Restrict the output,’ suggests the third. ‘Do not ship such small and mixed parcels,’ writes out a fourth. ‘Let us valorize the total rubber output,’ advises the fifth. I agree with all of them, including even the last, if the valorization follows my scheme of restricting the output, that is of storing up surplus crops in the shape of latex *in the trees*, and not as cured rubber in the warehouses.

“If there is one industry in which deferred crops are not only safe, but are actually improved in quality and increased in quantity by being kept back, it is that obtained from the latex of the rubber tree, at least from *Hevea brasiliensis*. Not only is the capital invested in a well-managed rubber estate safer than in most other agricultural industries when passing through periods of acute crisis, but, as just stated, delaying the crop is an advantage, not a drawback,

and this fact enables me to advise that the output be curtailed and prices raised to any level desirable by the following methods.

“Supposing the East, with its estimated 112,000,000 trees gave, at 2 lb. a tree, 2,000,000 cwts. or 100,000 tons of commercial rubber by 1920 (it is not going to do so, but the exaggerated output will emphasize what we wish to say). If this quantity, with 40,000 tons from the Amazon, caused rubber to drop to 1s. per lb. (even 6d. per lb. if you like), what would happen to the trees if the syndicates, by that time carefully organized and working in co-operation for self-defence, suddenly passed round the word, ‘Produce only 10 per cent. of your possible output this season’? Would it not benefit them by the rest? On the other hand, what would be the result to the shareholders—would it further add to their losses? Not a bit of it; such a course would be their only chance of securing their capital, and receiving dividends, and for these reasons:—

“Such a curtailment of output would mean that the East as a whole would ship only 10,000 tons of rubber, and the manufacturers, after being trained up to need 140,000 tons of raw rubber a year, would only get 50,000 tons, or just one-third. Is such a result impossible, or even difficult to bring about, once the organization is there to pull the strings? If arranged, especially if arranged quietly, the shock to the market would make prices run up to any level short of bankruptcy to the buyers (for that must not be allowed), or of the price-paying capacity of the public. It certainly would make prices run up to 10s., 12s., even 20s. per lb., causing the estates and their shareholders to realize as much as, or up to double the amount of, net proceeds for only 10 per cent. of their output, costing, be it remembered, but one-tenth the amount to place on the market that they would have incurred had they shipped the whole crop,

whilst all the time the trees would benefit by less tapping, and, whilst storing up larger yields of stronger rubber for the future, they would live longer and yield more freely from being less called upon for latex. Such a sharp curtailment of output would not be necessary, unless as a start, but 50 per cent., 30 per cent., even a 10 per cent. curtailment would make all the difference. To continue, however, when stocks are already accumulating and overdone, to put out a further 10 per cent. or 20 per cent. increase would mean to run down the value of the entire output in a manner that would be, to say the least of it, quite suicidal. Such a scheme as I am now suggesting as a remedy to this, if carried out in moderation, would not be prejudicial to the large manufacturers; they would, on the contrary, I believe, support it so long as it was only used to enable the estates to pay remunerative dividends, and to keep prices at a fair and, above all, at an even range of values, free from the violent fluctuations of recent years." Mr. Pearson bears me out in this in the remarks from his able pen, written twelve months after my notes, and which now follow what I went on to say on the subject, viz.: "Once let prices go down to 1s. 6d., much more to 1s. per lb., for any lengthy period; so low a cost for raw material would bring into existence a host of small manufacturers that would take all the profits from the older and larger houses when prices were down, but who would go bankrupt, or otherwise fail the public with their competition, were rubber to jump up in price, and they had not the means to continue. This occurred with cacao, and it is not beneficial, either to the public who buy or the manufacturers who sell, that it should be so, for in the end only a few very big houses survive, and these dominate the market; whereas with more regular prices this need not be. Better to have fifty reliable makers than five very large, or five hundred small ones.

“ Whether the West would join in with the East or not I do not pretend to say, but should imagine that they would be only too willing to do so, for, as Mr. J. P. Wileman said in November: ‘ Present prospects of rubber cannot by any stretch of imagination be looked on as encouraging, though low sterling prices may find some momentary compensation in the depreciation of the currency and consequent lower cost of production. That, however, can only be transitory so long as the supply of rubber continues to exceed demand and competition to sell at any price tends to force both gold and currency prices down. Nor does the remedy of buying up and storing rubber, that might be successfully employed with regard to coffee, seem applicable as regards rubber, seeing that the competition of plantation rubber would only be stimulated by the withdrawal of Brazilian supplies and so urge Eastern planters to greater efforts as soon as the war was ended and Brazilian accumulations had to be disposed of. The case of Pará rubber seems desperate and, like coffee, it has only the chances of a problematical American expansion, likewise largely paralysed by the war, to look to compensate the falling-off of civil consumption in belligerent countries. War orders may serve to help consumption in the Allied countries and so to make up for the falling-off in private consumption, but nothing more, and, as soon as the large quantities of rubber temporarily held up in consequence of the “ Emden’s ” raid is set free, it is to be feared that rubber will be dumped on London and New York to such an extent as to force prices to a still lower level.’ It would be certainly fairer and better for both to work together; but, if they cannot agree to do so, the East is independent of the West, and though, of course, the South American would be an enormous gainer by such tactics on the part of his Eastern competitor, their holding aloof need not keep the Eastern planters from benefiting themselves,

even if they had to benefit (unfairly to themselves) their competitors at the same time.

“ Little estates or owners, again, it may be urged, might break through the agreement, or never enter into one, but such details need not trouble the big concerns; retribution would soon follow. The syndicates or co-operated boards need only form a fund to buy up these smaller fry cheap when the day of trouble comes, and so maintain complete control of the market. I do not fancy, however, there would be any hesitation on the part of individual estates to join in, once it was made clear to the shareholders and their directors that they ran serious risks of being squeezed out of existence if they remained outside.”

Regarding my reference on p. 91 as to what the editor of the *India-Rubber World* had to say on the evils to manufacturers of violent fluctuations in prices, he told his readers in the article already referred to on “ What Manufacturers Want,” that “ efforts to corner rubber, such as that attempted by Vianna in 1882 and others a few years later, are not viewed by rubber manufacturers with the slightest degree of tolerance. They have in the past, fortunately, resulted in failure on the part of the speculators and, as a whole, meant loss to the rubber trade. So, too, fluctuations in price, whether from speculative or natural causes, have proved a distinct handicap. If crude rubber be very high, manufacturers find it difficult to get increased prices for their goods. Many articles in rubber if too high priced are displaced by others that contain no rubber. For example, leather belting takes the place of rubber belting, twine is used instead of elastic bands, &c. In the event of a sudden drop in the price of crude rubber, orders placed by wholesale dealers are cancelled and new orders placed at a lower price with other manufacturers. Hence, corners and fluctuations in price are feared by the rubber manufacturing trade

at large, and are a serious drawback to a regular and healthy growth.

“That rubber manufacturers will view possible efforts of rubber planters to curtail production and thus maintain high prices with favour can be denied. Such action may keep prices up for a time, but it will inevitably stimulate outside planting in all parts of the tropical world. It will also be a distinct advantage to those who have partially established plantations in localities not blessed with cheap labour. Further than this, it will be a constant incentive to those distinguished and scholarly German chemists who are step by step advancing toward the commercial production of synthetic rubber.

“The rubber manufacturer produces his quota of goods whether the price of Fine Pará be \$1 or \$3 per lb. Really what most concerns him is that the price be the same to all—himself and his competitors, in America or elsewhere, alike—and that violent fluctuations in price be done away with.”

In quoting this opinion I would claim to have given both sides of the case, *i.e.*, the big producers of the world faced by needlessly low and altogether unremunerative values, and the manufacturers, on the other hand, fearful lest prices should go low enough to bring in a host of butterfly competitors. The evil, therefore, being common to both sides, what more reasonable than that buyers and sellers should put their heads together to solve the riddle between them, *i.e.*, the manufacturers everywhere, the Rubber Growers' Association in London, and the Brazilian exporters, especially when the Government, with their 300,000,000 trees made available for tapping, is a producer as well, as I suggest that they can be, and should be, on p. 115.

One word as to which centre, East or West, could hold out the longest if a competitive war, let us say “to the

death " for the sake of argument, should spring up between them. Would not ultimate success lie with the one which could afford to leave everything to Nature and go elsewhere and work at other industries for a living until the tide turned in his favour. This being so, would it not be the most likely that Brazil would emerge from such a state the best able to proceed, and to take up the work again just as she had left it six or twelve months, or even five years back. What, pray, would be the position of the Eastern companies and the condition of their trees and lands, compared to the Brazilian forest trees, if they were left entirely abandoned for such periods? The labour also would tell strongly in favour of sparsely populated Brazil, for her natives, being at home, could always pick up a living, whilst the imported alien labour in the East, far in excess of local requirements, once work was checked on the estates (as was soon noted when the European War started), would be a very serious problem to handle were work to cease entirely for a lengthy spell in the manner described.

CHAPTER VI.

THE *SERINGUERO* AND HIS LIFE.

THE extraction of rubber is, of course, the most important industry of Brazil, being greater even than coffee in importance as a revenue producer, either for the individual States or for the Federal Government over them all. Whilst cacao is the dominant note in Bahia in the south and the prosperity of the State of São Paulo is absolutely dependent on coffee, which also forms an important export from Rio,* the Amazon territories are equally dependent upon the exportation of rubber, so that the failure of any of these crops causes severe local distress, besides throwing the national resources into chaos, as is the case at the moment; and one of the most pressing reasons why these, the leading industries of Brazil, must be placed on an organized and altogether more independent basis, and others developed or even called into being, is to avoid a recurrence of the present financial crash and deadlock. With Brazil's unlimited resources she ought not to have been reduced to the straits she was in, as pointed out (p. 92) by Mr. Wileman, even before war broke out in Europe.

As regards rubber extraction on the Amazon, the same as elsewhere in the full Tropics, that region possesses only two clearly defined seasons—the wet and the dry—the former when the rivers rise, the latter when they begin to fall.

* Particulars as to their export are given on p. 302.

The rainy or flood season of the lower rivers commences, as a rule, in November, and ends in April or May; whilst the dry season, or fall in the rivers, covers the remaining portion of the year. We therefore have rains and floods from November to May, and (more or less) subsidence and dry soil and atmosphere from June to October.

The aspect of the rivers during these rises and falls changes completely, as during the dry season the high banks become covered with a luxurious growth of vegetation, including beautiful flowers, and as the bed of the river appears, sand-banks many miles in length are formed, which furnish breeding grounds for numberless varieties of river turtle, aquatic birds and alligators, with here and there islands covered with magnificent trees, while every day is bright with sunshine, except for the occasional thunderstorms, accompanied by tropical showers, which in their violence and suddenness, coupled with their extraordinary brevity, are, I am sure, peculiar only to the Amazon or centres similarly situated. At any rate, those who wish to see perfection (?) in a tropical shower must visit the Amazon to do so.

It is, however, a very different picture that one sees when the rivers are in flood. Sand-banks disappear from view, the sites of many islands can only be distinguished by a few tree-tops, the high banks are no longer apparent, as the mighty rivers not only overflow them, but even cover thousands of square miles of the low-lying forests on either bank, thereby converting them into huge inland lakes and swamps, reminding one of the stories of that vast inland sea which undoubtedly prevailed throughout the centre of the South American continent. These lakes soon become the temporary home of alligators and other reptiles, whose calls replace the sweet songs of birds which render the forests so delightful in the dry seasons. During such times

the weeks are grey and sad, and the *seringuero* passes day after day in his hammock without any profitable occupation. Varying these spells of waiting for a lull in the rain, the man watches the rise or fall of the water against the poles of his rough hut to see when he will be able to walk on dry land and so continue his work again. Owing to this it is no uncommon thing for the *seringuero* and his family to pass several months of the year perched in such a poor habitation, sharing it with his dogs, fowls, and a host of insects, all unable to move far owing to the water that surrounds them. [Such a state of affairs is unprofitable to *patrão* and *seringuero* alike, and bad for the health of the latter. The day that the rubber-extracting industry can be rendered more independent of the elements, say as much so as it is in the East, the gain to Brazil will be enormous. To begin with, then and not until then, a better class of man will be attracted to the work than is possible to-day.

Even in the drier seasons the misery of the life appeals to all thinking men. Mr. Akers describes it with feeling and truth when he says (p. 92), in "The Rubber Industry": "Amidst these squalid surroundings, and in an atmosphere dense with smoke and impregnated with carbonic acid gas, the collector passes two or three hours every afternoon. It is often sundown before the day's yield of latex is coagulated, and this means that the man has been at work since 4 a.m., with the exception of the noontide rest of some two hours or so. In a climate such as that prevailing in the Amazon Valley, the tax on health and strength from these conditions is usually severe, and it is no matter for wonder that the number of men constantly incapacitated for work is abnormally high."

Then, again, as he says elsewhere (p. 28), when speaking of the low-lying districts: "They dwell in temporary wooden or reed huts built on piles to raise them above the tidal level,

and they exist on fish caught in the river, together with the absolute necessities of life, purchased with the proceeds of the rubber they take to the nearest store for sale. Year after year this desolate and wretched existence is dragged out with small profit to the people individually and no substantial benefit whatever to the community as a whole."

I was glad to meet this paragraph, for it confirms all I wanted to urge on the matter and to help me describe a state of affairs that should exist in no part of the workaday world in these days. How can any country prosper with such a rotten foundation as its basis of society and industry? In the same way as for selfish and practical, as well as for humanitarian reasons, the Factory Act was introduced into England, child labour abolished, and women prohibited from working in the mines, so will Brazil find, if she takes more care of her workers and lowest classes, that doing so will pay her in the end. Follow the lines suggested at the start when we discussed the Indian tribes, their pros and cons, and then we shall hear less and less of their working without a corresponding profit either to themselves or to the State.]

It is only when the river begins to fall that the *seringuero* is able to commence work, that is to say, from June to October in the lower parts of the Amazon, while the season is longer in the headwaters, lasting in some places from May to November, owing to the ground being higher.

Therefore it will be seen that the *seringuero* can only work during the summer or dry months, and this is precisely when the forests are unhealthy, and during this period the mortality among the *seringueros* is enormous, due, among others, to the following causes:—

(1) Paludic fevers and other diseases which have their origin in the damp heat and rotting vegetation.

(2) Beri-beri, consumption, and diseases caused by chills acquired while working in the swampy *seringals*, through

eating unhealthy food, the lack of hygienic air, and the insanitary surroundings generally.

(3) Chest diseases owing to the damp and aggravated by the inhalation of the dense smoke by which the rubber is cured.

(4) The presence of decaying vegetable and animal matter in the water which the *seringuero* uses for his cooking and drinking purposes. •

(5) The weakened and impoverished state of his system owing to bad food and want of attention to even the most elementary laws of hygiene, and a variety of diseases peculiar to individuals.

It would be better, therefore, not only for the men but also for the trees, were the whole industry to be carried out in a far less slipshod manner, and if the present overtapped areas near the rivers were replaced by others on the higher lands, sufficiently drained to remove the surface waters, more rubber would be obtained and less lives lost. To do this, however, Eastern forestry methods must be used to clear the undergrowth and to drain the land as on Eastern estates.

Unlike modern plantations, the rubber trees in the Amazon are not found at regular intervals, and the groups worked by each *seringuero*, known as *estradas*, do not consist of any definite number of trees. The number varies from seventy to 120 trees, according to their size or inequalities in the ground, which cause difficulty in obtaining easy access to them at present, but with cheaper labour of a more dependable nature the clearances between the trees might be better kept than now; it would cost money in the start, but then so does laying out an estate in the East, or clearing oil-palm lands in West Africa. To do so, however, pays in the end, provided, of course, you have sufficient labour of the right type, hence the need of breeding such supplies; but in calculating the number of trees in a large *seringal* the basis

is always taken as being roughly 100 trees per *estrada*, which seems to be a very fair average.

These *estradas* are opened up and trees located and grouped by a special class of men, before the actual *seringuero* can commence his labours. These men, called *matteiros*, are expert foresters and probably form the highest paid class of labour up the Amazon. They seem to be specially gifted in discovering the trees and in mapping out the paths which lead to each one by means of a zigzag course, always arranged in such a way that the outer or main path enclosing the *estrada* is circular in form, and designed in such a manner that the *seringuero* can enter the main path at any point and journeying round the *estrada* will enforcedly return to his starting point, a method which facilitates and quickens his labours and enables him to choose a site for his hut and smoking apparatus close to the main path, a most important convenience.

At the beginning of every rubber season, after each *estrada* has been marked out, the gatherer has to spend many days in the bush, removing growths from the paths, or perhaps fallen trees and boughs, replacing rough temporary bridges over swamp and stream, and collecting his *tijelinhas*, placing the number required for each tree at its base, inverting them on thin sticks already stuck into the ground to receive them. Each *tijelinha*, as the tin cup into which the latex flows is called, has a capacity of about 100 liquid grammes.

When the *estradas* have been cleared and the *tijelinhas* for each tree prepared, the *seringuero* is ready to commence the actual tapping. Starting about 4 a.m. he takes a hurricane lantern, for it is dark until about 6 a.m., and having provided himself with a *machadinho*, a *machete* (cutlass), and perhaps a rifle or short shot-gun, he sets out for the trees.

Visiting each tree in turn he makes a number of incisions (as opposed to the excisions in the East) in the bark with

his *machadiñho*. This is a small, blunt, axe-like blade, measuring about $\frac{1}{2}$ in. across, of soft iron (with the idea, I believe, that its dull edge is less liable to harm the cambium than the sharp edge of a steel axe), fitted to a handle about 3 ft. long. He allows the latex from each incision to flow and leaves it to coagulate, to be collected later, when it is worked into rough balls known as *sernamby*, or scrap. This is repeated two or three times in order to draw the latex to the base of the tree (probably to encourage the "wound response" we hear of elsewhere), and when this is acquired the *estrada* is ready for regular tapping.

It is the custom in the Amazon to tap rubber trees every alternate day, so each *seringuero* occupies two *estradas*, working them alternately.

The regular labours of the ordinary *seringuero*, as a rule, commence, as stated, from one to two hours before sunrise, and his utensils for the tapping and collecting processes consist of the above-mentioned *machadiñho*, *machete*, and a *balde*, or tin bucket, which is generally an empty kerosene tin to which a rough handle is attached. The latter he leaves at the entrance to the main path, close to his hut, and continuing through the forests, he makes rough gashes in the bark of the trees, and places a *tijelinha* immediately under each incision (by forcing it into the bark of the tree), as a receptacle for the liquid rubber. After every tree has been visited, occupying from two to three hours, he arrives at that part of his path where he had left the *balde*, and this being a spot close to his hut, it is his habit to return there in order to make his morning coffee and enjoy a smoke, remaining, perhaps, half an hour. As he has now no further need of the *machadiñho*, he leaves it behind, but not so his rifle or shot-gun, for it is always his hope that he may stumble across game of some kind which will provide him with food, thereby saving his pocket and giving him a welcome change.

After resting awhile he again enters the *estrada*, and taking with him the *balde*, he empties into it the contents of each *tijelinha*, and then leaves the latter inverted on sticks at the base of the trees already mentioned, in order to keep rain and other foreign substances from lodging in them.

[I would like to mention here that M. Labroy tells us, in his "Report on the Rubber Industry of the Amazon" (drawn up by him, with the assistance of M. V. Cayla, at the request of Dr. Pedro de Toledo, the then Minister of Agriculture for Brazil), that he is against giving up the *machadiño*. "All that is necessary," he maintains, on p. 42, "is to supervise the tapping a little and see that it is carried out so as not to harm the trees." To those who smile, and perhaps laugh outright, at the idea of any supervision in the forests up the Amazon, I would state that I believe in theory that the men are supposed to be overlooked, and this is confirmed by Akers, who says (p. 29) that "practically no supervision is attempted over the collectors in regard to the methods of tapping or preparation of the rubber, and consequently the product is of poorer and more uneven quality than that from the other producing districts in the Amazon territory"; and on p. 31 he says: "Nominally the collection of the latex is under the supervision of headmen appointed to safeguard the interests of the owners; but all discipline is slack, and regulations of any kind seldom enforced, except in the case of a very few establishments."

Writing on the Brazilian methods of collecting and preparing the rubber for market, as described in Labroy's report,* I quoted the following note from p. 42 of his statement: "All that is necessary," he claims, "if the use of the *machadiño* is retained, would be to supervise the tapping a little and see that it is carried out so as not to harm the trees," and then went on to say: "As such

* *Tropical Life* for February, 1914, p. 31.

supervision would be even more necessary with the tapping tools of the East, such a suggestion (as Labroy's mentioned above) is not out of the way; at the same time, as more scientific methods find their way into the Brazilian *seringais*, tapping instruments of the farrier knife type are certain to be found there, especially as many illustrations in the latter part of the report show such implements to be already used for tapping up the São Francisco River (fig. 80 in Labroy's report). I also show here the illustration of a Bowman-Northway knife, used in the heart of the forest in Bolivia. This property belonged to people in Boston, U.S.A., and the Australian manager was one that believed in grafting approved methods on the sound common sense of the native Indian and the hard-earned experience he has picked up in his struggle between the 'devil and the deep sea,' i.e., the half-breed driver on the one hand and the misery of being short of supplies on the other." But to return to the regular labours of the ordinary *seringueiro*; when the whole of the latex has been collected he is once again close to his hut, with the contents of the *balde*, which may be from $\frac{1}{2}$ to 4 litres (litre = 1.760 or $1\frac{3}{4}$ pint) of latex, which he empties into a large, wide, tinned or enamelled iron basin, and removes any portions of bark or other impurities with a piece of stick. This *bacia*, or basin, is then carried to the *defumador*, a small conical hut, built on the ground, much resembling a beehive. This structure is furnished with a hole in the roof, which allows only a portion of the smoke to escape, though its purpose is supposed to be that of a chimney or ventilator, whilst in the centre of the mud floor will be found a shallow hole scooped out of the earth. In this hollow are placed small blocks of massaranduba, carapaná-riba, pão-mulato, or other hard woods, but more generally the nuts of the "Urucuri" (*Attalea excelsa*), or less often of the Inaja (*Maximiliana*

regia) and other palms. These when ignited, burn well, owing to their oily nature, and throw off a dense volume of smoke, no doubt very good for the rubber but, in time, very bad for the man. Here, again, mechanical appliances should and could be introduced with great advantage. When well alight the fire is covered with a large cone of earthenware or metal, called a *boiao*, the top of which is open so as to cause a strong up-draught, and drawing up the thick smoke from the fire allows it to escape and to meet the rubber on its way. This is what the *seringuero* wants, for, having provided himself with a pole or the straight branch of a shrub about 7 ft. long, from which the bark has been removed to render it smooth, he causes this to gyrate by placing one end in a loop suspended from the roof and imparting a movement to it with his left hand in such a manner that it revolves with its centre about 6 in. above the mouth of the *boiao* (pronounced *boy-yaon*; this *ao* = *an* in English), where the smoke is densest and of great heat. He now takes a little of the latex in a dipper made, perhaps, from the half-shell of a calabash, and causes it to flow over the pole at this point. The hot and oily smoke causes the latex to dry and coagulate in thin layers, thereby forming the base upon which successive layers are formed, until the desired size is attained, and the well-known *pelle* results, egg-shaped or round in form, weighing sometimes 60 or 70 kilos, but generally about half this weight.

This operation of smoking, drying, and coagulating the latex takes from one-half to two hours. It can be assumed, therefore, that the *seringuero* must give up from seven to eight hours, at least, each day to curing the latex that he collects.

The yield of rubber varies, according to the time of year and moisture content of the atmosphere and soil, and hence of the tree and the latex. Thus elevated and better-drained

areas would give a denser latex than would be obtainable from damper, moister soil; probably the latex would have the highest percentage of caoutchouc globules in June and July.

It is the rule up the Amazon that every tree shall be tapped twice (that is, for two spells) during the *zafra*, or season, each period consisting of thirty-five days, at the end of which the incisions will be made close to the base of the tree, having started at the height of about 7 ft. and gradually descended day by day. "Overhead tapping," according to Akers (p. 20), "that is, above the reach of a man standing on the ground, is practically prohibited in the Madeira districts, and entirely so in the section of the State of Matto Grosso traversed by the Madeira-Mamoré Railway. However, it is a common practice in the vicinity of the Lower Amazon and its tributaries, on the Purús and Juruá, and in the districts of the upper rivers and its affluents. In many cases, especially on the islands of the delta, the tapping is carried up to a height of 40 ft. from the base of the tree."

This system provides that individual trees are tapped on seventy alternate days, and as the *seringuero* works two *estradas* it is easy to see that his whole tapping season consists of 140 days, more or less.

Taking the daily output of each *estrada* to be about 3 kilos—a very fair estimate for a moderate *seringal*—the *seringuero* ought to be able to produce about 420 kilos of fine rubber per season, a quantity, if obtainable, which is supposed to ensure him a good living wage, no matter how low the price of rubber might be.

This amount of rubber, however, is never obtained, partly from the insalubrity of the region and the consequent ill-health of the tapper, and other causes noted earlier in the chapter, and also on account of the holy or saints'

days, upon which the *seringuero* will never work, lack of ambition (a drawback which, like other things, *must* be improved out of existence), causing him to welcome any excuse which will give him a day in his *redé*, as the hammock is called.

A well-known Brazilian politician in Rio, who visited the Amazon some two years ago, when conversing with the writer with regard to the future of the Amazon rubber industry, declared himself of opinion that the *redé* had caused the ruin of his countrymen in the whole of the north of Brazil, an opinion which is shared by many others. Some *seringueros* habitually waste the greater part of the season in their hammocks (at times, perhaps, through debility on account of the dampness and unhealthy surroundings, and not always through pure idleness), and when at last called to account by their *patrões*, will bleed the trees without allowing the prescribed interval of one day, or will construct staging in order to tap the higher parts of trees, and have even been known to kindle slow fires at their bases in order to hasten the flow of latex, although, at the same time, they kill the tree by doing so.

Against practices of this description little can be done, for it must be noted that neither the *patrão* nor his employees are in the habit of visiting the *estradas*; too great is the risk of a conflict with the ill-treated *seringuero*, who considers these visits of others than his companions as a great injustice, for he is very zealous in guarding the privacy of the *estradas* in which he works and has his home and family. It is a fact, incomprehensible to many writers, that the Amazon *seringuero* does not cultivate the soil, yet the cause of this is at once apparent to all who know, and is a legacy of the system under which the Amazon rubber industry was instituted.

In the "boom" days of the industry neither master nor

slave had either time or inclination to cultivate the ground, consequently the *seringuero* depended upon his master for food, drink, tobacco, in fact, all his needs; and now the *seringueiros* consider that the *patrão* must provide them with everything in the way of food, medicines, and even firearms and ammunition, and, without wishing to "stick up" for the *patrões*, I say, without the slightest hesitation, that so long as this is the case the rubber industry in the Amazon Valley can never prosper, and so, with the ever-increasing output coming from the East, its fate is doomed. Again, as they rarely stay for long periods in any one spot, they also argue that they cannot be expected to improve the ground for the benefit of those succeeding them, and in allowing this both master and man, as well as the authorities over them, make the serious mistake of overlooking the fact that if everyone did a little to drain and improve the ground around his hut, all work done in this way would be co-operative and of benefit to one another. It reminds one of the old saying of "If each before his cottage swept, the village would be clean." Supervision, therefore, is necessary to enforce sanitary conditions, drainage, the cultivation of the ground, &c., as well as to see that the trees are not overworked, and that the latex is kept as pure as possible.

The fact is, that as long as the *seringuero* can rely upon his *patrão* for *farinha* (tapioca), coffee, tobacco, meat and drink, &c., although at exorbitant prices, he will never cultivate the soil, and he will deteriorate in every way, as the others have done before him; and his loss of spirit and health is also Brazil's loss, so a check must be put on such ways once and for all times. The original traits and strength of body and mind which made them intrepid explorers at the start have entirely disappeared under the influence of this lassitude and indifference on the part of

the men, and of the oppression and vice of those over them. Any change to be made can only be brought about by organized forces emanating from the Federal Government, backed up, if needs be, by the foreign bondholders and financiers who are not going to be deprived of their money because of the brutal ill-treatment of some and the listless lifelessness of the many. Air, light, healthy surroundings, a decent house and garden for each and every *seringuero* to occupy, and a just but firm insistence that each shall leave his house and *estrada* as clean and well-drained as he found it, is nothing unusual to ask for, and will, in a few years' time, when a start has been made, not be so impossible to secure as most Brazilians will say it is to-day. Again, I would say, if it is not securable then the West cannot expect to hold up its head against the East. Drive this well home to the Brazilians as a nation, and if they do not bring about a marked change for the better in a few years I shall be very much surprised.

CHAPTER VII.

PLANTATION RUBBER UP THE AMAZON.

THE Amazon forests are peculiar for the great number of lacticiferous trees which they contain, the majority of them producing rubber in some of its many forms, the principal one undoubtedly being the hevea, both in Brazil and out of it, and of the many varieties of this tree that known as the Black Hevea is said to give the best rubber.

According to the great botanists, Martius and Muller d'Argrove, the heveas are classified in the following ten species:—

<i>H. brasiliensis,</i>	<i>H. paniciflora,</i>	<i>H. lutea,</i>
<i>H. spruceana,</i>	<i>H. rigidifolia,</i>	<i>H. guayanensis.</i>
<i>H. discolor,</i>	<i>H. notida,</i>	
<i>H. membranacea,</i>	<i>H. benthamiana</i>	

Akers (p. 3) claims that “there are some seventeen varieties of heveas known to exist, the mainstay being *H. brasiliensis*, of which the three varieties most in evidence are the black (*preta*), the white (*branca*), and the red (*vermelho*). Broadly speaking, it may be said that the white and red species belong more particularly to the districts of the Lower Amazon and its feeders, and the black to the upper rivers and the territories adjoining the frontier of Bolivia, where the white and red varieties are also found, the former in greater abundance than the latter. It is from

the latex of the black hevea that the finest rubber is prepared."

In the higher regions of the Amazon Valley other species exist which, however, are very little worked. Chief among them may be mentioned *Manihot siphonoides*, Benth. Other species found outside the Amazon are *M. elata*, Mull., in the States of Minas and Bahia, and *M. crackeosa*, Mull. Arg., also in Bahia.

The heveas are all large trees, commonly growing to a height of from 75 to 100 ft., and measuring 4 ft. 6 in. to 7 ft. 6 in. in circumference. The branches are small and restricted to the crown of the tree.

Various classes of hevea are peculiar to low-lying, swampy ground, where the temperature varies little throughout the year, maintaining an average of from 20° to 28° C. during the day, but rising to 35° C. on rare occasions. The ground in which they abound is alluvion, moist, deep and spongy, and is generally covered by the floods from the rivers, not necessarily annually, but at least once in every four or eight years.

It is in forest growth of this description, made dense by innumerable lianas and creepers, grasses which cut like razors, epiphytic and other exotic growths which hide in their mazes snakes, tarantulas, hornets, mosquitoes, ants whose stings are almost as painful as snake-bites, wild and dangerous animals, such as the panther and jaguar, that the *seringueiro* makes his home. Who, therefore, can dispute that it would be far better were the forests to be cleared of all this unnecessary and, in fact, harmful life? But it must be done carefully, otherwise even the giant heveas may fall to the ground if caught by the wind.

The proportion of heveas to surrounding trees of large growth has been ascertained to be about 1 in 80, distancing from one to the other from 30 to 300 ft. The spaces in the

forest between all the larger trees are filled up with undergrowth, generally from 10 to 30 ft. and over in height, interlaced with the creepers, &c., as already mentioned.

The classes of hevea which produce the most abundant latex are *H. brasiliensis*, *H. discolor*, and *H. guayanensis*, but the *seringuero* does not make any distinction when inferior qualities are included in his *estrada*; all are tapped, and the inferior latex mixed indiscriminately with that of the better kinds, this custom, no doubt, explaining the lack of uniformity in fine Pará rubber, in spite of the fact that the rubber, in order to be classified as fine, requires a great amount of care in its selection and preparation.

The latex, for instance, must be quite free from impurities of any description, it must be absolutely liquid and perfectly fresh, and must be well smoked to prevent decomposition. When carefully prepared the whole *pelle*, from core to outer covering, should be of the same grade of rubber, known in Brazil as *borracha fina*, and not with a lump of soft or *entre fina* in the centre, put there either as a make-weight, *i.e.*, to cheat, or else because it attaches easily to the stick and starts the *pelle* of the real rubber more easily.

When not perfectly fresh, or if coagulation has been allowed to commence, the resultant product, when smoked, is known among Brazilians as *entre fina*, while if foreign substances, such as dust, ashes, sand, or the remains of other tappings are allowed to find their way in, the smoked product is called *grossa*, or coarse. It is also sometimes classed as *sernamby*, but this is incorrect, *sernamby* being a special and legitimate method of using up scraps, while *grossa* is worked into the *pelles* by dishonest *seringueros* to deceive the buyer.

Sernamby is formed by collecting the scraps from the *tijelinhas*, together with the thin ribbons of latex which, escaping those utensils, flow down the bark of the tree and

coagulate. These scraps, &c., are kept in tins, and when sufficient is collected are formed into rough shapes and covered with an envelope or thin skin of smoked rubber as a wrapper as well as for protection.

As everyone connected with rubber along the Amazon is aware, very little hevea has been planted as yet, although the advisability of doing so on a large scale has been talked of for several years, and an authority like the late Dr. Jacques Huber is reputed to have said that this was the only remedy against the increasing competition from the East. It is remarkable that the Amazon region, being the natural home and the original habitat of hevea, practically no provision has been made, either by the individuals or the authorities, to plant new trees in place of those damaged or destroyed through over-tapping or disease, in spite of the very solid fact that planted areas should and would be (if the trees are to flourish and yield well) much healthier for men and trees alike, although, as is queried a few pages further on, it is extremely doubtful whether the money necessary to plant up any considerable area would not be better expended in opening up, draining and rendering accessible the huge areas of forests said to contain 300,000,000 trees, waiting only to be tapped to give up double the yields that can be expected from the plantation trees in the East. Meanwhile, the authorities have promised to assist in the formation of new plantations.

Under date April 17th, 1914, the Federal Government published a decree engaging, among other things, to:—

- (1) Stimulate the rubber-extraction industry and encourage the cultivation of rubber-producing plants.

- (2) Create rubber factories and purifying plants.

- (3) Assist immigrants to the Amazon, irrespective of nationality, and also the *seringueiros* already established nearer to that region.

- (4) Facilitate transportation and diminish its cost.
- (5) Establish centres of cultivation for the production of foodstuffs.

Although, according to M. Labroy, hevea can be grown in almost any part of Brazil to as far south as 20°, and at an altitude of nearly 3,000 ft., provided the soil be sufficiently argillaceous and strong winds do not prevail, rubber-planting experiments of any importance have been left to the States of Ceará and Parahyba, and these have not proved successful for want of practical knowledge. Recent calculations place the number of mature rubber trees in Brazil as approximately 300,000,000, probably not one-hundredth of which are exploited owing to complete inability to reach them, or, if not that, then to want of transport, labour, cost of living, &c.

Possibly the only part of the Amazon where hevea could at present be profitably planted are the lower regions of the Amazon, preferably in the neighbourhood of the *Ilhas* and around Manáos and Pará, where the nature of the soil would ensure good growth and, being so much nearer to the mouth of the river and the sea, certain facilities exist there for transport of merchandise, &c. Compared to these centres the distant parts of the Amazon are not favourable for the plantation of rubber under the present system, cost of labour in clearing ground and transport being prohibitive. Much could be done by taking every convenient opportunity of planting rubber seed wherever open spaces occur. Thousands of such spots are to be seen along the banks of every river, among others, those where fuel for steamers had been collected, or where attempts at cultivation of some sort have been attempted and given up, or the chosen site for a *barraça* been abandoned. Every *seringuero* at the end of a *zafra* could be instructed to fell a few useless trees in each *estrada*, and plant rubber seeds in the spaces so made.

Along the whole length of the Madeira-Mamoré Railway suitable places are met with where hundreds of thousands of rubber trees could be grown to advantage, and yet, up to the present, neither this Company nor the Bragança Railway close to Pará have seen fit to plant the clearings along their lines with the money-making rubber trees, especially when grown on scientific lines so near the exporting centres.

[On the other-hand, the thought arises as to which would pay best, to clear and plant vast areas under healthy and scientific conditions, as has been done in Malaya, &c., or to open up the forests containing these 300,000,000 trees, clear and drain the *estradas*, and by means of mule tracts or, better still, commercial-motor tracts on land, and motor-boats on the rivers, to open up and render this area available for exploitation at once, and for cultivation of crops other than rubber and settlement as soon as convenient, with the ultimate idea of making the collection and preparation of rubber latex rather a subsidiary or second industry, instead of a leading and, in fact, the sole one? Actual average yields per tree along the Amazon Valley vary from 2 to 5 lb., but taking even 2 lb. of commercial rubber for the sake of argument, this return would equal 600,000,000 lb., which valued even at 1s. per lb. *in situ*, gives £30,000,000, or at 6d. per lb. it would be £15,000,000 per annum return. Tell me, therefore, if Brazil wants to be honest and punctual in her payments to her creditors, if she wants to make her own people prosperous, contented and healthy, has not man in his struggle with Nature, even out there in the depth of the Brazilian forests, already done things as wonderful, or even more wonderful, than the task would be with £10,000,000 or even £30,000,000 to draw upon (or twice that sum, if necessary, as time goes on and the case becomes proven and so more certain) to open up the forests containing, or said to contain, these hundreds of millions of trees?

This being allowed, would not those sums mentioned quickly be available, provided, as with some mines in Brazil or elsewhere, that only those who lent the money were allowed to direct the spending of it, whether Brazilians, English, Americans or others? By thus restricting the management, and especially the right to spend the money to those, or the direct representatives (and who could be moved by will) of those, who subscribe the capital, we should ensure that the money was devoted* solely to achieve the object for which it was lent, and that in its expenditure the utmost economy would be used so that the investors who run the risk would continue to have confidence in those who were spending the money. Brazil and the Brazilians would, of course, be welcomed, either as individuals, corporations, or trading concerns, municipalities, or even the various States and the Federal Government itself, each and all could subscribe to the loan, and the more they did so the greater would be the confidence engendered in the minds of those outside the Republic ready to join in. The entire management would be—in fact it must be—under the control only of the representatives of the subscribers; by this I mean that, whilst the Federal Government and the various States on whose territories the forests abound, might be allowed to nominate representatives, other than those elected by investors within the Republic, to give advice to the Court of Directors on the one hand, and report to their Governments on the other, such members, since they would not represent actual capital, ought not to be allowed to vote. If the Federal Government and any of the States take up shares then they would

* As in the case of the Americans with the Panama Canal; and who would be more welcome than Colonel Goethals, if he would only descend on the Valley and drain and open it up until it becomes as healthy as the Panama Zone is to-day, thanks to him, Sir Patrick Manson, and Sir Ronald Ross, who proved how it could be done.

be otherwise represented, the same as other subscribers, in addition to these nominated members. Those who wish well to Brazil and to such an undertaking as I have here described, which, by the way, should not be made up of a number of concerns, but only *one* large corporation (if only, by its very magnitude, to keep at a distance those most troublesome of pests, the rogue promoter and his parasites), will, I think, agree that such, or similar, precautions as those I have suggested will be best and to the ultimate advantage of all concerned. Worked under such conditions you would, at least, have a property and an output on which you could raise temporary loans, or otherwise finance, as occasion arises. As the *estradas* are now worked who would lend money on them or on the rubber (until it was safe and sound in their own warehouse)? "Might is right" out there, from all I can gather, and disputes are, at times, more plentiful than labourers or rubber. Again, quoting Mr. Akers (pp. 16-17), who confirms what everyone from the spot has told me (and their number is legion): "Many of these properties nominally comprise areas of several hundreds of square miles, and it happens frequently that large sections have been left unexplored by the owners. In such circumstances, titles to real estate possess small value as negotiable securities for commercial purposes. They are not assets against which bankers or merchants are justified in making advances, and are only accepted as additional security in cases where loans are contracted to enable the crop of rubber to be harvested under conditions entailing the shipment of the year's produce to the creditor for sale in Manáos or Pará, or for export to Europe or the United States. This uncertainty in regard to the tenure of land has been one of the principal drawbacks in the past to the acquisition to any great extent of real estate by foreign syndicates, and has proved a serious obstacle to the rapid

development of the Amazon Valley, especially in connection with the properties held under the three first headings I have enumerated elsewhere." What lends force to my plea is the fact that, according to the returns issued only last January (1915), the British and Dutch East Indies alone have 1,200,000 acres under plantation rubber. Such an area, even with present-day ideas of wide-planting, should carry, on an average, at least 100 trees to the acre, thereby giving the enormous quantity of 120,000,000 trees, and these, at only 2 lb. per tree, makes 240,000,000 lb., or over 100,000 tons of commercial rubber; and as this area is already (1914) shipping 64,500 tons, that quantity is well below the mark as to what the shipments will be when all the trees are being tapped. Surely, in face of such returns, there can be no wisdom in clearing land to plant rubber in Brazil, with its estimated army of 300,000,000 veterans, especially as, so far, rubber plantations in Brazil do not seem likely to be able to successfully compete against the East for some years to come, and meanwhile all this undeveloped wealth of rubber and land remains shut off from the Brazilian revenue seekers.

Mr. Woodroffe himself goes on to say that a few individuals have commenced small plantations on the Madeira and a few other rivers, but with doubtful results. This is not to be wondered at, for owing to local conditions rubber planting on a large scale is impossible unless coupled with the cultivation of foodstuffs, and until profitable means are found of utilizing the timber, which would have to be cut down in order to open up new ground. A few small plantations exist in the neighbourhood of Pará and Manáos, where old pasture grounds have been planted with hevea, and abandoned *chacaras* have also been made to serve; but all this has been done rather in the nature of experiments than as commercial undertakings, and so

It is asserted that the planting of hevea is an imperative necessity in the Amazon Valley in order to compete in quality with plantation Pará. This is not confirmed by the statement of Mr. Consul Michell, who, in his report, states that Brazilian rubber is the best obtainable, a fact which has been confirmed by Eastern planters and those interested in that industry, and also by the prices ruling from month to month for the Brazilian *pelles* as compared with the Eastern kinds.

In view of the fact that it would be unprofitable to form new rubber plantations, except in the Lower Amazon, probably the best situations for extensive planting are the overworked *estradas*, such as exist in Marajó, Inajás, Tocantins, and the vicinity of Pará. Here rubber extraction is still carried on, though the rubber is of inferior quality. Probably more attempts in agriculture have been made in this portion of the Amazon than in any other, consequently more open ground is available. The lands are low lying and are extremely suitable for rubber growing, whilst the soil is undoubtedly of excellent quality and possesses all the characteristics desirable for hevea.

Transport is frequent, navigation is easy, and freights should be and are (when compared with other points) comparatively cheap. M. Labroy, in his report to the Brazilian Government, specially recommends the Xingu, Tapajos, and Madeira as suitable localities for the cultivation of rubber. In none of them would it be necessary to cut down large tracts of forest land, as huge pasture lands suitable for cattle raising exist. There is no doubt that, once the capital and the will is there, if the rubber industry is in such a parlous state that planting on a large scale is necessary to save it, it would not be difficult to plant these available open grounds with hevea trees. At present, however, both the capital and the will (to overcome all obstacles) are missing.

The fact is, that the average intelligent Brazilian questions the necessity for planting, simply because hevea is so abundant in his forests. He knows that the supply of wild rubber is practically illimitable, and cannot see the object of planting more trees extensively in new localities at his own expense,* when a reduction in the cost of living and transport alone would enable him to explore virgin rubber forests capable of producing more rubber than that to be obtained from the results of ten or even twenty years' extensive planting. Who shall judge whether he is right? Certainly not the Eastern planters and experts with a few years' knowledge of their own country and probably none at all of the heart of Brazil.

There are millions of trees awaiting the day when it will be convenient to tap them, consequently it cannot be sustained that the Amazon industry is wiped out. It is there, the same as the minerals underground, awaiting the visit of the prince to kiss them and bring them all to life again. Let us only hope that when that day comes it will result in the good of the many, and not only to appease the selfish rapacity of a few, who may and will probably harm themselves through their greed and do no one, not even the country, any real good. The people themselves are beginning to recognize their serious position, and it is to be hoped that a San Martin or Bolivar of commerce will soon appear and show them how to use every effort to save the industry and the country. They have learned the part played by certain groups of selfish financiers and merchants of Pará and Manáos, and, perhaps, now the more thoughtful among them dimly recognize the importance of rendering themselves self-supporting. A friend of mine, who returned to Europe only a few days ago after spending nearly a

* This is the reason why I make the proposal I do on p. 115 *et seq.* to consolidate the Brazilian rubber forests as a whole, as otherwise it will be centuries before they are utilized.—ED.

lifetime in the forests, assures me that in many of the river areas nearly every *seringuero* now has his patch of mandioca, beans, maize, or bananas. I was glad to hear of this, for it is decidedly a step in the right direction, and if some have started others may and should soon follow. Such an example is of infinitely more value than the planting of new grounds with rubber, at any rate at this stage of the struggle, and I cannot help feeling that such a thing was unthought of two years, perhaps even a year, ago.

It must not for one moment be imagined that the planting of a certain number of new trees is unnecessary. The man who does not try to improve his property is a dead-head, living on his capital. Every right-thinking *patrão* knows the advisability of replacing dead trees, but up to the present he has been handicapped by the high cost of living, transport and labour, due in a great part to avoidable reasons, including probably his own extravagance and persistence in iniquitous practices, which, in their turn, hold the *seringuero* in debt bondage. That they are seeing the error of their ways promises much for the future. Cheaper living, and consequently cheaper labour, will enable them to cut down superfluous forest trees in the existing *estradas* to the benefit of those that remain, not only to the rubber trees, but also to the *seringuero* and his family as well, for the more open the trees and the more air and light you admit, the less terrible will be those awful swarms of insects during the heavy rains and flood seasons that would make life miserable, I believe, even to an East Indian coolie, were it possible to cover him with his smelly coco-nut oil $\frac{1}{8}$ in. thick. The thinning out of forest trees must be done with care lest the others fall, but so long as the roots are left in, where they do not interfere with the fresh planting, the standing trees should be fairly safe.

Most *estradas*, as they stand at present, contain certainly eighty non-rubber-producing trees to each hevea, some of

them of great value as timber. When, therefore, it is profitable to extract timber, the men who know the value of the trees can then remove them with a treble profit, viz., to the rubber trees that are left standing, to the pocket of the *patrão*, and to the advantage of the rubber gatherer and his family. In the space thus obtained they could grow vegetables and foodstuffs, and, in the shade of these, plant hevea seedlings (preferably from a nursery elsewhere) at regular intervals. The *seringuero* would thus, in time, be able to tap many more trees than is the case to-day, and with less labour to himself, and if he persevered he or his successors could double and even treble the output in a few years' time, when the new rubber trees would be ready for tapping; and what are now dense forests, in which scattered heveas only are found, would in time (which passes wonderfully quickly in such cases), probably be of infinitely more value as rubber plantations than any which the East has yet produced, or ever will, at a correspondingly low cost.

There would not be any necessity for the collecting of seeds (except to turn into oil), as hardy young plants could be obtained in the forest and transplanted to convenient spots prepared to receive them (where pests of all kinds are kept away), until wanted for the final planting out. The Eastern planters have to commence by growing their seeds, running the risk of losing a percentage of those which do not germinate. The Brazilian has no need to run this risk; if he has lost valuable years, he may yet make up for them by obtaining such young trees and conveniently grouping them in chosen situations until needed, knowing that every one would be a certainty, barring breakages and hungry animals. He could carry this out successfully by transferring the young plants into baskets made from rushes, cane, &c., similar to those used for packing farinha. Care would

have to be taken not to damage the roots, and with a convenient quantity of undisturbed earth the young plants could, be dropped into the baskets and, when finally to be planted, easily transported to holes dug out ready to receive them, basket and plant together. The ground round about the new shoots should be kept clear of weeds, &c., by a judicious planting of sweet potatoes, soya beans, ground-nuts,* or other suitable pasture grasses.

This is really the only practical and profitable method of raising plantation rubber along the Amazon. By such means costly new roads to points difficult of access are avoided, at any rate at the start. Valueless growths in the *estradas* now exploited must be destroyed and plants of economic value put in their place. There seems to be no need to pay huge sums to experts to be told that certain parts where rubber is unknown are suitable for its cultivation, when its flourishing condition elsewhere under similar conditions makes it sufficiently apparent to justify the planter or owner to open up his *estrada*, when otherwise he might not do so.

Much has been expected from the *Defesa de Borracha*, which cost the Federal Government ridiculous sums of money. The only persons to profit were the highly salaried officials and employees, the sum total of whose efforts was reports of doubtful value, certainly in practice. Its suggestions for the establishment of factories and all the other benefits promised in the Decree of April, 1913, have come to nought, even the improved tapping tools suggested by experts having failed to show their superiority over the much-maligned *machadiño*, with its incised cuts, as opposed to the removal of the bark.

Nearly everyone who has written anything about the

* About which I have much to say in Chapter XX.—ED.

Amazon rubber states that the cost of production must be reduced. Some would commence by abolishing export duties, and others advocate an increased output. To suggest the first is easy enough, but no one has been able to say how it can be done, as the taxes upon rubber produce 80 per cent. of the revenue, hence the imperative reason for developing other industries to share the burden, as well as to distribute the risks by not having all the eggs in one basket. A reduction of the import duties would assist the Amazon greatly if it really reduced the cost of living, but the needless extravagance of the *seringuero*, which is encouraged by those over him on account of the huge profits they secure (on paper), renders it doubtful whether the lowering of the duties would alone enable Brazil to compete successfully against the East. Why, therefore, cut adrift your revenue when you have no means to recover it on other industries if you are still out in the cold as a seller of rubber? Then, again, it seems that, at present, the Federal Government, with whom rests the taxing of imports, could not reduce these duties to assist the rubber industry alone, for the Brazilian Constitution stipulates that the import duties shall be equally adjusted throughout the Republic.

Gutta-percha is growing scarcer every year, and if the *estradas* were treated in the manner suggested a great number of labourers would also be at liberty to extract balata from the Amazon forests. The supply of balata in Venezuela, British Guiana, &c., is rapidly becoming exhausted. With the decrease in supply prices increase, and the exploitations of the balata reserves of the Amazon could, without doubt, be even now a profitable undertaking.

The advisability of planting rubber on a large scale has more than once been advocated by friends of the Brazilian industry; one of the principal arguments being that the

Eastern rubber planters have great facilities for examining their trees, because they are planted at regular intervals, and the number of trees, with the average yield per acre, is well known; those in the East can also maintain a rigorous inspection of the latex and avoid impurities because the day's collection is brought to a central factory. Centralization also reduces working expenses. These are all very real advantages which the Brazilian rubber man does not possess as yet, but the day will come when he can have all these benefits and more. It will come all the sooner if he increases, step by step, without unnecessary expense, the number of trees on his *estrada*, and when he does this an assured income, if not actual riches, could readily be his. It is calculated that under existing conditions (dear transport, high cost of living and labour) wild rubber costs, as already shown, not less than 2s. 4d. per lb. to produce; yet it is entirely in the hands of the Brazilian whether he corrects his past and present errors, thereby increasing his output whilst reducing the cost of his rubber, as he could do in the manner suggested in this chapter; for I believe that in the course of a comparatively few years the effects of judicious deforestation and the planting of hevea in those places where it is at present exploited would make it possible for Brazil to produce her rubber at such a cost as would make it possible for her to compete against the East, especially when it really comes to orders for "Fine Hard," for Brazilian forest rubber is admittedly superior to all other, even if the methods of coagulation and curing are of the crudest. In order that this supremacy in quality may be maintained, better treatment for the labour, time, and money-saving appliances must be insisted upon in its preparation, whereby it can be smoke-coagulated in bulk. Newer methods must replace the old-fashioned *boião* for smoking; the latex must be carefully strained to

remove impurities; greater care must be paid to standardization of quality, as by the elimination of *sernamby*, *entre fina*, &c., from the *pelles*, so that a larger proportion, and not only 50 to 60 per cent., obtains the top price; and these improvements would be rendered more easy by judicious planting.

Cheapening of transport, reduction in cost of living, &c., will not assist the *patrão* in this important question, for though excellent in many respects, improved systems of coagulation without smoke, viz., treatment of the latex under the Mendes or Pinto system, would not show good results in the hands of the great majority of *seringueiros*; and Mr. G. B. Michell, Consul-General of Great Britain at Pará, in his report on this city's trade for 1910-12 and part of 1913, after referring to the condition of the rubber industry, says it is likely that all but the finest rubber will disappear from the Pará market, and that greater care must be taken in purifying the latex to turn out only the best. The necessity for opening the *pelles*, pulling out the inferior grades, and removing adulterations from Amazon rubber, must be a thing of the past, and none but the purest rubber produced should leave the *estrada*, much less the ports.

I have suggested how transport in the Amazon Valley could be cheapened; the benefits to be obtained from the planting of hevea and foodstuffs; and how the cost of living and labour could be greatly reduced, and consequently the cost of production of rubber very materially decreased.

Consul Michell, in the report referred to, also says: "The local product is burdened with taxes and charges which it cannot bear," &c. Then follow particulars of the taxes which the local State and the Federal Government levy upon all rubber exported. They are undoubtedly heavy, to-day averaging 5d. per lb., or 28 per cent. *ad valorem*, on the local prices.

When rubber was at a high price no one objected to paying this, as the percentage of profits was also high; but to-day, when rubber is going out of the country at a loss, the matter becomes very serious. The Bolivian Government has instituted a sliding scale of export duties on rubber, governed by the fluctuations in its market value; but in Brazil, though of urgent necessity, there seems to be no signs of relief as yet. The revenue of the Amazon States is almost entirely derived from the export duties on rubber, and in the event of their relaxation other taxes would necessarily have to be imposed under a system of direct taxation, and the individual, until other industries arise to share the burden, must be just as badly off as ever, or worse, for he would have difficulty in meeting his obligations to the State in currency, and to obtain money he would have to borrow, and we all know what that means in this *peon* zone. Even as things are, both the State and Federal Government are in dire straits. There is little cash in the Treasury coffers, and public employees are said not to have received their pay for nearly two years, whilst the foreign bondholders are clamouring for their unpaid interest. It is true that a saving could be effected by reducing the *alfandega* and other administrations to the simplest possible form, and the cost of working them to a minimum. Little hope, however, can be held out that anything of the sort will easily happen whilst political graft plays such an important part in their administration.

Dr. Pedro de Toledo, late Minister of Agriculture in Brazil, gave an illustration of this when receiving a delegation from the Amazon which approached him to seek relief from the heavy export taxes. He told them that he believed the export tariff was too high, but pointed out to the deputation that, whilst the Government would do its utmost to foster the rubber industry, it expected those directly

affected to do all in their power to encourage that cultivation of the trees to cheapen the gathering and preparation of the rubber, so that the shipping and commercial connections of the Amazon could be made a single issue for the general promotion of a trade which is still looked upon as Brazil's industrial glory. We all know that, since these words were spoken, Brazil has gone from bad to worse, and if an economic and fiscal revolution, of a pronounced type does not soon set in, as did the political one in France in 1793, no one can say what Brazil will be doing ten, twenty, or fifty years hence, especially as regards her rubber industry.

CHAPTER VIII.

RUBBER AND ITS LABOUR SUPPLY.

THE labour supply of the Amazon Valley is one of the most important factors which face the industry, and little has been done by any of the Governments and local authorities concerned to solve the problem beyond a slight amendment in laws relating to "loan slavery" made by the Bolivian Government, and which will do little to help those who are most in need of assistance.

As already stated, it is well known that the rubber gatherer in the Amazon, whether *cauchero*, *seringuer*, or ordinary labourer, works, almost without exception, under conditions which are terrible to contemplate, even for those who have become hardened. The miseries and hardships they are, unnecessarily, forced to undergo are of a nature so revolting and cruel as to be difficult of expression in print. To Colombia must be given the credit of obtaining an amendment to the laws dealing with labourers in certain districts adjacent to Bolivia, though doing so did not prevent the scandals exposed by the Putumayo report. Again, although these reforms may bring some relief to the Colombians themselves and the natives of other South American States, known as *racionales*, these are not in so dire a plight as are the less fortunate Indians, and so are of little real value in considering the labour problem in general.

The decree promulgated by the Bolivian Government

provides that *all contracts between master and man shall be drawn up with the conditions of service, period, and remuneration clearly defined, also that such contracts shall be signed and registered in the nearest police-court.* What a farce this provision is can readily be seen by anyone who takes the trouble to find out how few and how distantly separated such courts are, and this in a country where a journey of 200 miles by launch is a serious undertaking, much more so when runners or canoes are alone available. A peculiar stipulation in this remarkable decree is that employers will not be permitted to *sell* liquor to a labourer or servant, but liquor may be supplied to him *as a gift*. So far as this particular measure is concerned, it can only have the effect of making the poor man's condition worse than it ever was before, and will, without doubt, cause the masters to lay in larger supplies of liquor than ever, and the labourers to get more of this tissue and soul destroying concoction than before.

The lot of the rubber gatherer in any part of the Amazon Valley is not a desirable one; even when free from ill-treatment and oppression, or when they are able to earn what appears to be, at first sight, large sums, when the life these men and their families are obliged to endure, and the hardships and dangers consequent upon their calling are taken into consideration, it will readily be seen how inadequate their remuneration really is. They are at present suffering from the effects of the acute financial crisis prevailing in the Amazon region, which latterly has become more and more acute, and unless matters greatly improve in the near future many of the families run a bad chance of starving. This has already happened in certain parts of the River Javary, according to a letter from a trader there, and large numbers of the rubber workers have deserted some of the regions, robbing, plundering, and destroying every-

thing, thereby increasing the loss to the State, all of which could be avoided were the *seringueiros* producers of food-stuffs and so partially independent of rubber, only tapping the trees to augment their credit at the stores, or to give them a little hard cash, either to save or with which to improve their position as cultivators.

It has been suggested on more than one occasion that means should be found to encourage immigration, particularly among the Portuguese, Spanish, and Italian races, yet little support has been given to the movement, probably because the *patrão* does not favour the introduction of these new supplies of labour, which would probably be on a higher plane as regards education and social and political ideas, and would not tolerate the peonage system for a moment or put up with the flagrant cases of ill-treatment meted out to the present tappers. On the other hand, these outsiders, knowing what a bad reputation has been attached to the rubber traders, are afraid, in their turn, to trust themselves to the inhospitable regions where rubber is obtained.

Japanese have been introduced into certain parts of Brazil, but not to any noticeable extent. The largest party seems to have been brought from Japan on board the *Wakasa Maru*, which disembarked 1,500 men, women, and children at the port of Santos some time ago. The reception accorded to this batch was so enthusiastic that eighteen of the crew of the steamer promptly deserted as well. A large colony was also employed for a time in the region of Paucatanambo in Peru, and another body of Japanese is, or was to be, found in the neighbourhood of Riberalta in Bolivia, where they have almost obtained control of the fishing and agricultural industries. They have also strongly entered into competition with the local population as rubber collectors, labourers, carpenters, mechanics, barbers, and shopkeepers of every description. They are honest, patient,

hard-working, orderly, and thoroughly reliable citizens, and I think their colony has a grand future. In Iquitos and the adjacent rivers considerable numbers of Chinese are to be found.

The majority of them, the same as in the British West Indies, are shopkeepers, whilst some are cooks and menials in the towns, and others become proprietors of small rubber estates, which they have developed from insignificant beginnings as market gardeners, entirely owing to their inherent industry and thrift. This is the class which must be watched and encouraged, for they form the nucleus of that class, Japanese, Chinese, Indians, *Caboclos*, or half-breeds,* which I want to see established throughout the entire rubber-producing area of Brazil, as similar men are to be found elsewhere in the Tropics, planting, trading and working as mechanics, engineers on the railways, &c., but all the time with a second string to their bow in the shape of an *estrada* or two, which they and their family can tend, as is done in the East, and then gather in the latex, either curing it themselves, or, better still, taking it to the central or district factory (possibly run on co-operative lines by each individual latex collector and his neighbours), and receiving payment in cash for same on a sliding scale, according to the price in Europe or America.

* For whom Algot Lange, in his book, "The Lower Amazon" (G. P. Putnam's Sons, New York and London), has an unbounded regard. In this, claims the *India-Rubber World* of New York, in their review of the book, he is following the opinion of the best ethnologists, and his description of the people and the reception they gave him show them in a very attractive light. He takes us into the rubber-worker's home and shows him as a human being, describing not only his work but his economies, his household furnishings or lack of them, and his diversions. In this connection it is not inappropriate to express the opinion that no matter how low the price is brought by plantation rubber a certain amount of the Brazilian forest product will still be gathered.—ED.

Proposals were put forward in Brazil to introduce Chinese labourers into certain regions, but the movement was so strenuously opposed that the Government was obliged to reject it. The opposers to the movement argued that the initial expense incidental to recruiting and transporting was prohibitive; that control over a large body of Orientals would be very difficult; and that the Chinese labourers, who were admitted to be thrifty and industrious, would quickly oust the Brazilian labourer from the north of Brazil. [If this latter excuse should prove true, it can only be the fault of the Brazilians, and since the *raison d'être* of this book and, in fact, of the undermining generally of the Amazon rubber industry by the East, is purely a matter of efficiency, then the sooner the Orientals come along and, by their competition (and by inter-breeding), raise the efficiency in the native worker to their own level, the better for Brazil, and especially for the native, and it is only false kindness to say otherwise. If the Eastern is the better worker—and he undoubtedly is—then the Western, who is competing against him, must go down as matters now stand; and that is why the Federal Government, if it does not wish to lose its (at present) chief wealth producers, must go East for those qualities which are lacking in the Republic, and by judiciously blending them with the good points in the Brazilian worker, especially his ability to stand the climate and hardships connected with the life, rear up in time an improved race with as many of the combined good points, and as few as possible of the drawbacks, of both hemispheres. Then, and not until then, will the Amazon be able to maintain her supremacy as a rubber producer, and even rise superior to her rival. At present the very thing needed to save the industry concerned from the difficulties it is now in, viz., solving the question of an inadequate and inefficient labour supply. has helped to plunge the Amazon rubber

industry into its present abyss of gloom and general depression, for academic discussion alone, on the inadequate labour supply, and on which so many seem to trust, has existed galore, but has not and never will result in the adoption of any practical suggestion or lead to a solution to safeguard either the interests of the individual or of the State and the Federal Government as a whole.]

The majority of the labourers on Brazilian estates are natives of Pará, Ceará, Rio Grande do Norte, Pernambuco, Maranhão, and other northern centres. They are recruited by agents sent out by the rubber masters under a system too well known to justify further description. They work as rubber extractors until they have paid off in produce the amounts charged to them for transport, advances in cash or kind, and other expenses peculiar to the system and often needlessly incurred. The supply is, apparently, not always reliable, for I understand that a good cotton crop in Brazil at once diminishes the supply of labourers, since the men, being in funds, will not undertake the arduous labours of rubber collecting. It is rarely that they return to their native States, which *should* be glad to have them back even if they are not to return, but when we have better conditions much good could be done with them whether at home or after they have turned *seringueiros*, for the training they are, I hope, some day to receive will enable them to train their families along lines similar to those they are to be taught. Labourers are also recruited from the flotsam of such places as Manáos and Pará, where criminals, who are already practised *seringueiros*, are wont to congregate at certain seasons in order to indulge in their natural lusts and wickedness, and such men do more harm to Brazil, its reputation and industrial progress, than those who have not had to do with them can possibly imagine. These men can be depended upon to

show plainly that his confidence in them is waning, as when they lay their plans to obtain as much credit as possible; but directly they are curbed in this they decamp, possibly after committing a murder or two, &c., in a way which effectively hinders pursuit or makes an early discovery of their crimes difficult.

In the forest and agricultural districts of Peru and Bolivia, the only¹ available source of labour in any quantity is the Indian in his savage, semi-civilized, or nearly civilized state, most of whom are illiterate and who are to all intents and purposes slaves in every degree. In these countries custom and tradition are stronger than the written law, and the Indian is looked upon purely as a chattel and as such has no rights, or, as the Latin Americans express it, *son animales*.

Such things generally, however, are brighter in Brazil, and figures are available which enable a clear idea to be formed of the outlay required for labour, and to calculate its effect on the cost of the production of rubber.

Labourers recruited in the coastal and interior towns of Ceará, &c., cost about £50 per head to bring into the rubber regions, according to the time of the year, and the delays in Manáos and Pará awaiting suitable transport. About the end of the flood season navigation is but little impeded, and men can be carried to remote points in the interior with comparative facility, but at the beginning of the dry season much difficulty is experienced owing to the stranding of steamers and little depth of water in many of the rivers, consequently the outlay for expense of passages, advances and maintenance is enormously increased. But the recruiters do not mind, since all the money expended in bringing the men and their families from their homes is charged to them, *plus* a commission, generally of 15 per cent., but sometimes more, which has to be liquidated

from their deliveries of rubber. Unscrupulous masters seize upon this fact to recruit their men at a period when the maximum of delays is expected, as a result of which the *seringuero* arrives at the scene of his labours too late to succeed in producing enough rubber to very materially reduce his debts. When this is the case, the *patrão* has a large body of men, women and children at his command, who at the close of the *zafra* (as the collecting season is called) are only too glad to get any accommodation, however poor it may be, close to the *patrão's* residence, so that in return for food and a few necessities they can assist in household and other duties. The men are sometimes occupied in the planting of mandioca, but generally in hunting and fishing to provide fresh food for their *patrões* in return for an occasional bottle of liquor, &c.

I have seen it stated in many places that the proprietor of a *seringal* has no real hold over his men, and that practically no punishment can be meted out to them for desertion or failure to cancel their debts. This is only true in those districts where the authorities are powerful and humane enough to protect the suffering individual from unjust treatment or harshness; but in remote *seringals*, where the only authorities are the *patrão* and his agents, backed by the law of the '44, the men are absolutely in the power of their taskmasters, and they rarely, if ever, are in a position to desert, much less liquidate their debts and obtain employment in more favoured regions.

Whether in the lower waters, where transport is comparatively cheap, or in remote rivers, where the transport of merchandise necessitates an enormous charge on the prime cost of the goods (whilst the rubber is worth less on account of this very cost of getting it to market), the *seringuero* has to pay excessively for all he consumes owing to the truck system in vogue in all rubber districts, and

which is persisted in owing to the facilities it offers for excessive and illegitimate profit to the vendor. This vicious system is the basis of all accounts with labourers and employés throughout the Amazon, and is nothing more than organized robbery on a huge and particularly cruel scale. Wages, though apparently high and misleading, are reduced to a minimum in face of the iniquity of the system which permeates to every branch of commerce and trade. The heavy cost of transport and duties on imported merchandise are not nearly so much to blame for the situation to-day as are the far-reaching effects of the truck system. As I show in a previous book, "The Upper Reaches of the Amazon," and other writers also have noted, the merchants in Europe and elsewhere sell to the South American traders (*aviadores*) at a large margin of profit, and they, in turn, sell to their *aviados*, as the rubber masters are described, at prices which ensure a large return, even if there are a number of defaulters; the *aviados* now sell to the *seringueiros* at prices which cover them against any risk of non-payment by the *seringueiro* through disease, death, or desertion. Consequently, the unfortunate *seringueiro*, who is honest and pays right through, has to purchase on credit articles of necessity at prices which in most cases are equal to five and even ten times their original first cost at the factories. The *seringueiro* has few pleasures, for his outlook on life is enforcedly a gloomy one, therefore it is only natural that bright cloths and fancy goods for himself or his womenfolk are eagerly bought *on credit*, no matter what their price. It is these articles which play an important part in "debt bondage," when the *seringueiro* brings in his rubber for delivery and is under the influence of the *trago* which the *patrão* usually dispenses to him before doing business. At the same time, this abominable waste of money offers a margin of resistance against the East that may take

much to overcome, for what the *seringuero* and his *patrão* will forgo in the way of needless expenditure before they succumb to low prices may yet prove sufficient to take the wind, financially and otherwise, out of the Eastern planter's sails and leave him stranded and not the Brazilian.

Until the truck system is abolished and regular rates of pay for task or piece work are the rule, the rubber industry of the Amazon can never be conducted on a sound commercial basis, and were the Orientals to be introduced into the Amazon Valley in noticeable numbers, this system would very soon "go to the wall." Meanwhile its abolition would be facilitated and eventually assured if attention were paid to the food supplies, as the presence of home-grown food-stuffs would do away with the need of buying from outsiders. Under present conditions the staple articles of food are *xarque* (dried meat), beans, *farinha* (mandioca or tapioca flour), maize, coffee, sugar, lard, salt, &c., all brought from great distances at heavy expenditure; and yet dot the Orientals along the Amazon and see if they do not speedily lay out gardens with such produce, in spite of the damp and the rains.

Fresh beef is not always obtainable at present, but should be. Game, fish, and sea-cow are abundant and easily procurable, and form the *seringuero's* present meat diet; *farinha* and maize, eaten green as food or allowed to ripen for feeding fowls, pigs, &c., could be grown with the greatest ease; sugar does well in many parts of the Amazon, as also do a host of other foodstuffs, which only await intelligent exploitation to render the rubber districts almost self-supporting; but so long as the *patrão* can do business in goods under the truck system, he will hinder the *seringuero's* facilities for growing them himself; and just so long as the *seringuero* can obtain them at a store under the present system, he will not readily attempt to cultivate them for

his own use. Nothing but the introduction of the Asiatic will change all this. Again, the housing of the *seringueros* in the Amazon is a disgrace to humanity, and until they are substantially improved, the status of the workers will remain at a level far too debased to enable him to properly compete with his Eastern rival. The huts, at the best, are primitive structures, built of palm slats, and thatched with leaves, while though they may have floorings, with walls of palm, grass mats, or reeds in some *seringals*, they more generally are open to the elements and have mud floors; or even when they are floored the ground is often low-lying and liable to inundation; this, in a district notorious for its dampness, requires no further comment as regards the unhealthiness of the life. These huts are constructed by the men themselves, but no payment is made to them for the work, or, in fact, for any improvements; and on no point do the bulk of the men need reformation so much as their incorrigible indifference to the state of their houses, and the comfort generally of themselves and their families. There is never any attempt at hygiene, consequently the amount of sickness of a malignant character is great. Offal is generally thrown, and allowed to accumulate, on the banks of the river, creek, or lake upon which the hut is situated, generally at the foot of a path where the canoes are moored. This same point serves for the collection of water for domestic and drinking purposes, for washing clothes and for bathing, and also for cleaning fish or game previous to their being carried to the kitchen. How, therefore, can the men be healthy and the industry be expected to thrive amidst such a miserable state of affairs?

In Bolivia and Peru the truck system also prevails, and is protected by Government. The laws of these two countries do not permit of a *peon* leaving the services of an employer until he has paid all he may owe, or can find

another *patrão* who is willing to employ him and assume responsibility for his indebtedness. (This should be noted, for it is far easier for the rubber gatherer to find his way out of Brazil and within the boundary of another Republic, than he realizes—until he is caught.) When the latter is the case the new master charges the *peon* with a commission of 20 per cent. over the total amount of the debt, so that the financial condition of the miserable worker is worse, even if his treatment be slightly better under a new *patrão*.

The system has been given a number of names, but none of them express the working of it better than "virtual slavery," and until public opinion is sufficiently roused to demand and insist that such methods shall cease it cannot be grappled with with any hope of success. Until the spread of education awakens the *peon* to his actual condition, and he is shown that an agitation has been undertaken on his behalf, I cannot see that there is much hope for an early and radical change in his state, or that the fetters which so effectively hold him in bondage will be unshackled, and their further use rendered impossible. [The hope for a better state of affairs lies with the bondholders being moved to take drastic steps in the matter for political and financial as well as (perchance) humanitarian reasons. Let those countries who are anxious to place 10,000 or 20,000 Asiatics firmly in the Amazon Valley, buy Brazilian State Bonds to a degree that will give them a decided voice in the management of the Republic's finances, and then they will secure the power to insist that this improved and more efficient class of labour shall be allowed to go through, in order that the investments of the bondholders shall be safeguarded and the interest on their bonds more regularly paid than has hitherto been the case, and than apparently will always be the case if the class of labour and the ways generally of the Amazon Valley are not improved practically out of existence. I say this be-

cause it will be remembered that rather less than two years ago a meeting* of the Brazil Colonization Company was called together in Tokyo, which was presided over by Baron Shibusawa. The syndicate which was formed in 1908 to further a scheme of colonization for Japanese in Brazil had noted that the development of Germany and Italy largely depended on the development of their emigration, and the work done by these countries in that direction offered Japan a good example to follow. To Japan it is an absolute necessity to encourage emigration, as their food supply, especially of rice, tends, at times, to prove insufficient. The best plan to overcome the difficulty, said Viscount Oura, ex-Minister of Agriculture and Commerce, who addressed the meeting in question, was to find a suitable colony in South America and send emigrants there to engage in productive industry adapted to the soil and climatic conditions of that country. It would open an outlet for the ever-increasing population and contribute to the building up of the national wealth. The syndicate was making investigations preliminary to carrying out the object it had in view, and had already arranged to expend a sum approximating 80,000 yen in five consecutive years, and having secured from the Government of São Paulo, Brazil, the privilege of a free concession of land covering an area of about 12,250,000 acres on March 8th, 1913, started a plan to form an emigration company jointly with Baron Shibusawa, Baron Kondo, and Mr. Nakano. As the syndicate had been organized with the sole object of developing national economic interests, and not individual interests, it was to cede its acquired privilege to the new company on its successful flotation. Should the undertaking be successfully carried

* The *Japan Times*, I believe, published a full report of this important meeting at the time.

out with the support of influential business men, which the promoters were anxious to secure, it was expected to prove a great impetus to the advancement of national economic interests, but at the time of writing I am unable to say to what extent these hopes have been realized.

According to Mr. Ikutaro Aoyagi, representative of the Tokyo syndicate, the scheme was a purely Japanese enterprise, its object being to establish a colony of Japanese settlers and to start Japanese industries on foreign soil 10,000 miles distant, with absolutely national capital and their own labour. The enterprise had been warmly received by the Brazilian public. The State Government of São Paulo, where the syndicate acquired the territorial concessions, enacted a special law for a free concession of State land to the extent of 50,000 square cho, the payment of the passage of Japanese emigrants, and other privileges, to the syndicate. The colony was situated between 24° and 25° N. lat. on the southern coast of São Paulo, and the climate was mild and adapted to the Japanese, with a temperature ranging between 80° and 90° F. in mid-summer and about 50° F. in the coldest season. The soil was rich and fertile, being especially adapted to rice cultivation. Rice planting was a most promising industry for Japanese immigrants in view of the quality of soil and the special experience of the Japanese in its cultivation. Moreover, Brazil largely imports rice from abroad, and as the market price of the article was, at that time, as high as 35.45 yen (yen = 2s. 0½d.) a koku (koku = 4.96 bushels English, practically 5 bushels), it offered good prospects for the industry. Pig raising, sericulture, and tea planting, are also hopeful as incidental business for immigrants. As a start the company was to send 3,000 emigrants, collected by the company; and in future the company would have the assistance of other Japanese emigration concerns interested in the collection of settlers.

The company intended to send about 5,000 emigrants annually.

“The Japanese are certainly an enterprising people so far as we can judge from the specimens of the race who appear on this side of the water,” writes the *Brazilian Review*, of Rio, when discussing the matter at the time. “Their chief characteristic seems to be a constant optimism under all circumstances, combined with an unquenchable hunger for experience and instruction. They take on engagements in any capacity, quickly learn their business, make their ‘patrons’ teach them the language of the house, laugh on all occasions, become ‘cheeky’ or go out on the ‘spree,’ get the ‘sack’ and sheer off, mentioning as they depart, with a delightful smile, that they will send round one of their countrymen to take the place vacated, and that he ‘will be jus’ so good as me!’

“The ‘Japs,’ to use their familiar diminutive, seem disposed to profit by the Brazilian Government’s invitation to ‘come over and help us.’ A company called the ‘Takushocu Kaisha,’ which is, in the vulgar, ‘Colonization Company,’ of Tokyo, has been formed, whose object is, in the first instance, to found a Japanese colony with headquarters in Iguape, for the cultivation of tea, and perhaps silk. With their usual methodical shrewdness they apparently mean to avoid the course usually followed by certain other nationalities, of loosing a heterogeneous horde of uneducated bucolics to disperse themselves, without light or leading, throughout the territories destined to receive them. On the contrary, they have already despatched men to search this land of Canaan, as did a certain other colonization company in days of old. An engineer, an agricultural expert, a physician and a staff of assistants are now on their way to São Paulo. The duty of these pioneers will be to make a thorough examination of the ground to be colonized; and

this process being complete and satisfactory, 100 families will form up, march into the encampment and start work. Others will follow, until two thousand families have established themselves, when other branches of cultivation, probably of rice and other cereals, will be undertaken. The whole enterprise, it is understood, will be under the control and supervision of Sr. Ikutaro Aoyagi."

At the time the South American Supplement of the *Times* (of March 25th, 1913) also referred to Japan's activities in opening up colonizing centres for her people in South America, and those interested may be glad to be reminded of what this paper said. "There is a great deal of interest being taken in Japan at present in emigration to South America," reported their Tokyo correspondent. "An emigration steamer is shortly to leave for Brazil, and the Morioka Emigration Co., in conjunction with the Toyo Kisen Kaisha Steamship Co., is at present recruiting emigrants for Peru. The emigrant has to make a payment of £14. Out of this the emigration company takes £2 commission, consular fees are paid, and the emigrant is given 30s. to land with; the balance is kept by the steamship company as fare. The port of arrival is Callao, and much of the work to be done is in the immediate neighbourhood of Lima. Sugar, coffee, cacao and cotton are mentioned as the chief kinds of plantations, and it is also pointed out that there is a very large opening for a trade in fish. Fish abounds off the coast, and a great deal of it is consumed (presumably imported salt fish), but up to the present the local fish industry seems to have been neglected.* . . .

"Japan has for some years turned her attention to Brazil as a field for Japanese labour, and recent political events will have a marked influence on this. When Prince Katsura

* See also *Tropical Life* for September, 1911, p. 181.

was premier some three years ago a company was formed under the auspices of the Minister for Agriculture and Commerce, Viscount Oura, to acquire some good agricultural land in the State of São Paulo, Brazil, and to settle a number of Japanese upon it. Since the recent fall of the Saionji Cabinet Prince Katsura has again been premier, Viscount Oura having the Home Office, and on January 13th a large meeting was held at the premier's official residence in order to proceed with this scheme. A large tract of land has been leased from the State of São Paulo, and it is now hoped to send out some 2,000 Japanese families to settle there. The President of the Nippon Yusen Kaisha Steamship Co., Baron Kondo, is on the committee, as are several prominent business men, so that with this backing the scheme should be a great success. The Brazilian Government is very much in favour of it, and has offered to do all it can to help in every way.

“Emigration of Japanese to Brazil has been going on for some time, but this State-aided scheme of sending out farmers and their families to land leased by Japanese owners will give a better status to the Japanese in Brazil, and should give an impulse to the whole emigration movement. Wherever the writer went in Brazil there was always a cry of *falta de braços*, and it is indeed labour that is wanted to open up and make productive much of this magnificent land.”

Personally, I wish the movement every success, as the more workers that flock into South America the better for the countries trading with that continent. Dr. Toledo, Minister of Agriculture, who presided over a Rubber Congress in Brazil, declared that the rubber grown in the valley of the Amazon would be sufficient to meet the world's consumption, if that region were worked in an economical and practical manner. The learned doctor admitted, however,

that this would be possible only with a relatively dense population and much better transport facilities than now exist. The Japanese, at any rate, suggest a means of overcoming one of these two difficulties, and once the labour is there no doubt transport facilities will soon be forthcoming.]

The evils set out in this chapter have, without a doubt, affected the output of rubber and the cost of its production very seriously. The cost of bringing labour from Ceará is excessive; the conditions under which the *seringueiro* lives render him susceptible to sickness and consequent loss of output; his supply of food is of poor quality and inadequate to fit him for sustained effort; the want of medical assistance causes him to have recourse to patent "cure-alls" when ill, for which he pays extortionate prices and obtains little or no benefit; the iniquities of the truck system increase the cost of transportation and of living in general; and until the rottenness of the whole labour system of the Amazon and the method of remunerating the men is improved, Brazil cannot expect to produce the finished rubber at prices capable of competing with those of the Eastern planters.

It has been repeatedly argued by some Brazilians that the Amazon Valley has been converted from trackless forests to a high state of civilization, entirely by the efforts of men from the Northern States of Brazil. True it is that the States of Pará and Amazonas have such fine cities as Pará and Manáos, but it must be remembered that such States as Ceará, Piauí, Maranhão, &c., have become depopulated through the emigration of its young men to perish in the rubber forests; and that this loss to these States and to the Republic is irretrievable, and by weakening her in this way, month by month, the *estrada* owners are rendering her less capable and able to successfully compete as a rubber producer, or in any other way with the outside world. It is, in plain English, slowly but surely bleeding Brazil to death.

There is to-day an inadequate labour supply on the Amazon, but bad as that is, the state of affairs must be still worse in Ceará and elsewhere, whence the fresh supplies of labour for the Amazon come from. Already we are told that these States have sent their best to the rubber grounds and now can send no more, while those from the States, other than what I have mentioned, are, for one reason and another, unsuitable.

Those, therefore, who talk of Brazil abandoning any idea of the immigration of cheap black and yellow labour, and who talk grandly of men and women of ideals (?) similar to those of Brazilians themselves, will do well to say what these "ideals" are, and from where they can expect to draw such superior beings who will go to the Amazon. Probably, if the despised indentured labourers were allowed to enter the Amazon they would improve the status of the natives, and, at the same time, reduce the cost of the rubber whilst increasing the output which so many seem to think desirable. Their introduction would most certainly release those Northern Brazilians, if still left alive, who now have to lead such uncongenial lives and who would then be at liberty to pay some attention to profitable agricultural or industrial pursuits.

While it is true that many countries have refused entrance to coloured indentured labourers from patriotic motives, it is equally certain that Brazil, from similar motives, will have to admit and welcome them with wide-open arms and every possible help, especially when pressure is brought to bear on them to do so by the Republic's foreign creditors.

CHAPTER IX.

SETTLERS IN BRAZIL.

JAPANESE, CHINESE, NEGROES, AND NEGROIDS.

UNDER the terms of the agreement with Brazil, previously referred to, the various Japanese emigration societies have succeeded in inducing about 15,000 emigrants to leave their native land for the State of São Paulo, where a syndicate of Japanese has obtained a concession for the development of agricultural pursuits.

The scheme as it stands is a purely Japanese enterprise, and like those of the German and Italian bodies in Brazil, the Japanese colony will remain apart from all outside social and political influences, at least for the present. Later on, however, when the *Caboclos* and the Indians who come into touch with these visitors, have got used to them, I hope the two people will interbreed and no longer keep apart.

The object of those who have the immigration of Japanese in hand is to establish colonies of settlers and to start Japanese industries with purely national capital and labour. The State Government of São Paulo has enacted a special law allowing the Tokyo syndicate a full concession of land, free passages for Japanese immigrants, and certain other privileges. This land is situated between 24° and 25° S. lat., on the south coast of São Paulo, where the climate is mild and adapted to the Nipponenses, the tem-

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perature ranging between 80° and 90° F. in mid-summer, to about 50° F. in the coldest winter season. The soil is said to be rich and fertile, being particularly adapted for rice cultivation; pig raising, sericulture, and tea planting are also expected to be taken up by the Orientals.

The immigration syndicate mainly responsible for the bringing of Japanese colonists to Brazil is known as the Taku-shocu Kaisŷa, or "Colonization Company," and its capital consists of 20,000 actions of 50 yen (2s.) each, a total of £100,000 sterling; but there are a number of other Japanese immigration societies also sending batches of excellent material to Brazil.

As stated in the preceding chapter, the *Japan Times* recently printed a report of a meeting in Tokyo of the "Brazilian Colonization Company," presided over by Baron Shibusawa. The Company was formed to take over a syndicate, composed entirely of Japanese, which was formed in 1908 to further emigration of Japanese to Brazil. It had been noticed that the prosperity of Germany and Italy largely depended upon the development of their emigration, and the work done by them in that direction gave Japan an example to follow. It was an absolute necessity for Japan to encourage emigration, as food supplies, especially of rice, were rapidly becoming scarce, whilst Brazil, on the other hand, needs the surplus population that Japan begins to realize that she must send them. Viscount Oura, ex-Minister of Agriculture, who addressed the meeting, said that the best plan to overcome the difficulty was "to find a suitable colony in South America and send emigrants there to engage in productive industry adapted to the soil and climatic conditions. Emigration would open an outlet for the ever-increasing population and contribute to the general wealth of Japan. It was expected that if the undertakings of the syndicate were successfully carried out, and received support

from influential business men in Japan, the emigration scheme would develop national economic interests, to the advancement of which it was expected to give great impetus."

After reading in the last chapter what the *Brazilian Review* had to say on the Japanese and their temperament, is it to be wondered at that the Americans in the Western States of the United States of North America fear a people who are so thorough in all they do, and yet who the Yankees find it difficult to say why they are to be kept out of regions which require developing just because they are thorough, sober, and painstaking in their efforts? Let us hope that the Brazilian Government will not be so foolish, for as every Brazilian ought to be taught to realize, the Japs offer just the class of individuals required to turn Brazil's waste and non-productive territories into inexhaustible sources of wealth.

A reasonable objection to the presence of these Orientals might be, and probably is, advanced in the plea that they will come like a cuckoo's egg, to be hatched and matured in Brazil until, as the offspring develops, it will, with its greater vigour, thrust aside the local Brazilians until they get pushed out of the nest altogether, or forced under and smothered. The suggestions advanced in the opening chapter of this book will, however, avoid any chance of this taking place, or of the Orientals dying out amidst the unhealthy conditions that they are bound to meet at first in the forests and plains of Brazil. This is why it will be beneficial, and, in fact, necessary, if Brazil is to become sufficiently populated and so able to go ahead, for the immigrants introduced on a large scale to be willing to interbreed with the Brazilian Indians, Caboclos, and half-breeds, and not to permanently form separate colonies apart from the indigenous race.

The *Times* of March 25th, 1913, in a leading article,

stated that the Japanese have for some considerable time emigrated in large parties to South America, generally to Peru, where they were employed as labourers and industrials with the principal agricultural companies. Most of them were carried to Peru under the auspices of the Morioka Emigration Company and the Toyo Kisen Kaisha Steamship Company, Callao being their principal port of disembarkation. The emigrants used to pay £14, of which £1 10s. was given to them with which to land, £2 being retained by the emigration company, and the remaining £10 10s. paid to the Steamship Company as passage money.

The immigration of the Japs to Peru has, however, been discouraged for a multiplicity of reasons, but chiefly because it was not easy to submit them to the national system of peonage and similar methods of paying (?) labour. They wanted their pay as they earned it, month by month, and when it was not forthcoming they did not want to be told that it was credited in current account, which resulted, unless they were immediately satisfied, in their always giving a lot of trouble.

Meanwhile they assisted greatly in developing Chauchamayo as an agricultural centre, and, if fairly treated, would have been the founders of a peaceful and thriving population, as they can and will do in Brazil if given a chance. Discouraged, however, the majority of them left Peruvian territory and, descending the river Madre de Dios, formed the nucleus of a thriving colony at Riberalta, on the River Beni, just below the mouth of the first-named river. Here, so far as I can gather, they have peaceably settled down to a variety of pursuits, including fishing, agriculture in all its branches, horticulture, and timber extraction and forest exploitation for use in every branch of the carpenter's and woodworker's crafts. I hope and believe that this colony is going strong, and if so, those who wish to see Brazil

expand should take advantage of the work these pioneers have started and encourage others to join them. Such a start is most valuable as an example and inducement for more to come. It is the first start that is so difficult to make.

As industrials the Japanese are to be found working as carpenters, joiners, builders, signwriters, smiths of every description, and they also have excellent shops where they sell the produce from the farms of their agricultural compatriots, a class of traders in home-grown produce that cannot be over-appreciated by the Government, either of the individual State or of the Republic as a whole.

They also are established in Riberalta as barbers, laundrymen, cooks, domestics, shop assistants, clerks, butchers, and even *seringueros*, and being peaceful, sober, polite and punctilious citizens, they have rapidly earned the respect of all who have had dealings with them, and appear to offer every ground for confidence that this colony and the example of its members will eventually influence the local Brazilians, not only in the neighbourhood of Riberalta, but up the rivers Madeira and Mamoré, in Bolivia, in the north-western portion of the State of Matto Grosso, and, as time goes on, even much farther afield; and if this is the case with one colony, how much more rapid will be the progress made by a hundred or a thousand similar ones.

Japanese have penetrated to the interior of Brazil from the Pacific for some considerable period, many of them finding their way thence *viâ* Chili as well as Peru. They now know the country well, so that any State-aided scheme to assist them in first establishing pioneer colonies in Brazil, and then to arrange for others to follow suit, is bound to meet with success, and besides improving the status of the Japanese themselves all over South America, such a movement would enormously facilitate the work of others who are striving so hard to help Brazil, especially as the success

of those who have made the start will increase the flow of immigration from sources other even than the East. Thus, I believe, we shall start with the lower class of Oriental, coupled with the Caboclo and the Indian, and gradually improve the class of emigrant until we reach up to the well-educated and scientifically trained capitalist or his representatives.

It must be remembered, too, that the Yankee "Monroe Doctrine" is not viewed with favour in every part of South America, and particularly is this so in Brazil. No one can yet see the effects of the Yankee expansion in South America, and as the Japs will not readily forget the treatment meted out to them in the western portion of the United States, the Latin American country which can count upon the influence of several million Japanese settlers would also have a call upon Japan for her moral assistance in times of acute political crises.

Emigration is a serious necessity to Japan in an ever-increasing degree, and her internal troubles, owing to over-population, are becoming more and more acute. The famine in Aomori and Hokkaido at the end of 1913 was the worst known since 1869. Crops were not one-tenth of normal, whilst the fisheries also failed, poverty becoming so acute in some regions that the sales of female children by their parents to the agents of Geisha and kindred societies reached a scale and a degree of publicity never before attained, even in Japan.

[The Japanese have also turned their attention to rubber growing in the East, both in Malaya and their own island of Formosa. In Johore a large company has acquired 80,000 acres of land suitable for rubber planting, and up to February of this year (1914) had already placed 30,000 acres under cultivation. The capital of the company is 10,000,000 yen, or £1,000,000 sterling, as against the £100,000 of the

Brazilian Emigration Company. Rubber and other estates managed by Japanese planters compare very favourably with those under European or similar supervision. They are practical farmers, and rubber trees cultivated by them are said to grow much faster than those on other estates.

Writing on "The Japanese Stake in Malaya," the (London) *India-rubber Journal* tells us that the "rubber plantations owned by Japanese are chiefly situate in Johore with a few on Singapore island. We should think that in no other country and in no other industry outside their own country and colonies have they so large a financial stake as here. From the returns of their own Association—the Japanese Planters' Association of Malaya—we see that members of the Association at the end of 1914 owned 87,440 acres in Johore and Singapore, and controlled a labour force of 6,098 with a Japanese staff of 309 persons. Of the area named 39,057 acres were felled and 36,842 planted. Only a small percentage of the area is, however, in bearing. The figures quoted are for areas controlled by members of the Association, who are forty-one in number; a further four individuals outside the Association own 947 acres, of which 251 are planted up. The largest individual estate owners are Naoya Akuzawa, with 11,395 planted acres (one of the largest areas of rubber in a single proprietary anywhere), Baron H. Mitsui, with 4,601 planted acres, Baron H. Fujita, with 3,797 planted acres, and Toranosuke Furukawa, with 2,600 planted acres."

Japanese labour is almost wholly employed on these Japanese estates, and as the men are satisfied with coarser food, wages are less; consequently administration and running expenses on an estate run by Japanese are much less than on other Eastern estates. Many Japanese growers are even now making better profits than the majority of Oriental plantations managed by Europeans, and there is a

with as a competitor of the English and European planters in the East. Being on the spot and ready to combat every move, it would not be a matter of surprise to me to see the men of Dai Nippon eventually win the game and take a leading part in rubber production and finance, as for years past they have done in all they have undertaken. This being so, it is easy to realize what an important ally the Japanese and their descendants could prove in helping to place the Brazilian rubber and food-production industries on an organized and stable basis, assuring the labourers ample supplies of fresh food, and enabling the Republic to produce her rubber at competitive prices.]

China, attracted by the activities of Japanese emigration societies, has also awakened to the need of enterprise, and there is little doubt that with the progress of Japanese colonies the Chinese will follow suit. Far more than the Japs they have for years emigrated to Malaya, the West Indies, the United States, and other centres, but, unlike their island neighbours, they have overrun the regions which have suited them, mostly as cheap or indentured labour with its common attributes, although in many places they have prospered as merchants, financiers, and agriculturists, and become very wealthy as with rubber-planting and tin-mining in Malaya. No class of men should prove so useful in Brazil, either as agriculturists, miners, or rubber men generally, as the Chinese who have had a preliminary training in the Federated Malay States or the Straits Settlements.

Large colonies of Chinese exist all over the South American continent. They are particularly numerous as small shopkeepers in Iquitos and other towns all along the Amazon Valley. Large numbers of them are to be found in Manáos, Pará, and along the River Madeira, where they were attracted in the first place by the Madeira-Mamoré

themselves to settlements already formed, they have interbred among the "cholos," as the civilized Indians and "mestizos" of Quechua and similar origin are known. This new race of "Chino-cholos," as they are called, is common in many districts of Peru, and goes to prove all we have claimed, that the Orientals and the Brazilian natives can and will freely interbreed.

It is well known and recognized that the Oriental is of an average intelligence and activity far in excess of that of the ordinary Peruvian villager, and there is every reason to believe that attachments between Chinese and Indian women are on the increase. This is probably due to the better treatment received by the Indian women at the hands of the Chinese than is generally the case with men of their own race, particularly when the latter are under the influence of "coca" or other stimulants. The same state of affairs is mentioned in the opening chapter of this book, even in the United States, where the white girls go freely with the Chinese men, as they find them more liberal and equable in their moods than their own countrymen, so long as their jealousy is not aroused.

No serious attempts have been made up to the present to develop any recognized scheme to use Chinese, either in agriculture or in the rubber industry, although the Japanese are using Manchurians on their Malayan estates. For instance, a batch of 288 Manchurians from the North of China recently arrived at Singapore for one of the Japanese rubber estates in Johore. These men are described as being particularly fine men, whose physique compares very favourably with that of the ordinary (Chinese) coolies. They are not organized and in consequence have confined their attention as individuals to commerce and to obtaining work as domestic helps.

Wherever a few individuals have settled in the villages

of the Amazon Valley they have proved peaceful, sober, industrious and painstaking, but although well able to take care of themselves as a rule, their extreme humility and servility in awkward situations causes them too often to be victimized and ill-treated by drink-fuddled parties of "cholos," and sometimes doubtful "white men," and in Iquitos they have on several occasions had to helplessly stand aside while mobs raided their shops. With an increase in their numbers, however, this would be a thing of the past.

The immigration of larger bodies of Chinese to the Lower Amazon has long been delayed, but it is to be hoped that they will soon begin to arrive under Government control, and, like the Japanese, help to populate and develop the forest lands and rivers of the Lower Amazon, where, with the Indians and cholos, they can rear an improved and thoroughly acclimatized family on an increased scale to populate the river and forest areas and develop farming, trading, and even tentative manufacturing industries, and so help the Brazilians to help themselves. Properly located and controlled, the Brazilians need have no fear that the Chinese or Japanese will overrun the country and drive the natives of Brazil out of employment, and as Brazil can easily take another 20,000,000 inhabitants, in addition to her present population, and can never really go ahead until she has them (since no other race can supply this want, although Italy and Germany elsewhere than in the Amazon Valley have done their best for Brazil and their own country), it is difficult to see how Brazil can prosper, above all, how she can pay her foreign creditors punctually, without the help of these supplies of labour from the East, to be reared up as labourers and small peasant proprietors.

Negroes and negroid races form a substantial portion of the population of every Latin country in South America, more so than some of the units having negro blood in their veins

are willing to own. They have penetrated to the Amazon from the western coast towns of Chili, Peru and Ecuador, and have also come down the Caqueta from Colombia to join the descendants of the thousands of slaves originally brought across the Atlantic direct from the West Coast of Africa. About two hundred West Indians came to the Amazon for service in the Putumayo with the famous Arana concern. It was they who incidentally caused attention to be called to labour conditions in the various Spanish South American Republics. Natives of the same islands and the Guianas were also attracted to the Amazon Valley by the constructional work of the Madeira-Mamoré Railway Company as work on the Panama Canal became scarce. Few have remained in Brazil, much, I am regretfully impelled to admit, to the advantage of the region, for a more belligerent and depraved lot of black rascals, as many of these proved to be, it has never been my lot to meet, although those who have had to do with the men in Barbados, Trinidad, and elsewhere in the West Indies find this difficult to believe. They can only suggest that the better class of men have settled in the Panama zone, or returned to their own islands with their savings in order to take up land of their own to plant, whilst the best men, knowing, after a time, of the brutalities that went on under the hirelings of Arana and similar concerns, never left the West Indies, and that, as a rule, it was the more aggressive and less stable class who remained in Brazil and proved undesirable, having got further depraved through the example and misery they came into contact with in the rubber zone.

Be this as it may, during the construction of the railway they were a constant source of disorder and riot; drunken, lazy, impertinent and dishonest black rogues, who never tired of acclaiming their freedom as Britishers and hurling every hurtful invective imaginable against their much more

peaceful and better-behaved Brazilian negro brethren. Such men, needless to say, do far more to prejudice others, be they white, yellow, or red, against the blacks, than would be the case if their behaviour was that of the normal negro or mulatto. Whether the Brazilian be negro or Zambo, he is a fellow human worthy of every respect, and although many of them have been free men less than thirty years, there is to-day not the slightest taint of slavery or symptom of oppression in their bearing. It is true that, like most negroes, they have little ambition, and consequently work only when obliged to do so, but, as a rule, they are peaceful and generous to an extraordinary degree when properly handled, so that the advent of the unruly blacks is to be deplored, and most certainly to be avoided far more than the introduction of Oriental labour.

The North American citizen, particularly those from the South, as is well known, has no love for negroes or people with negro blood in their veins. This is very apparent in the conduct of many Southerners who held high official positions with the Madeira-Mamoré Railway Company, both in the course of its construction and afterwards. The Brazilian Government's representative and consulting engineers were Dr. Geraldo Rocha, a native of Ceará, assisted by Dr. João Campos, a very clever engineer and a man of high education and moral character, though a full-blooded negro, as are also his wife and child.

So long as the chief consulting engineer, Dr. Rocha, was available, no American could be induced to deal with Dr. Campos, a fact which must have caused the latter many bitter moments. The day, however, arrived when it became necessary for Dr. Rocha to resign and make way for his negro assistant, much to the consternation of the Southerners. They were, however, not in a position to protest and had either to resign or swallow their prejudices, which most of

them preferred to do, but to be prejudiced in such cases is a mistake; it is indeed a sign of weakness, otherwise what is there to worry about? "Fowl no fret 'fore cockroach," says the Creole negress, and so, in the same way, why should the white, if he is so immeasurably superior to the black, be so upset when pitted against him as a worker?

The quondam second, now chief, consulting engineer showed his higher grade of intellect and natural generosity in giving no sign that the feeling which his appointment had caused was known to him, with the result, I am glad to be able to say, that within a few weeks he was in constant demand as a guest when it became known that the Government had confirmed his appointment; when his power as a representative of Brazil was recognized he became the object of deep respect and every negro-hater was only too eager to be friendly with him. He, however, accepted few invitations of hospitality, and rather than receive attentions from those who had openly despised him, he spent what little leisure he had at home with a few faithful friends.

About the same period a revenue officer was appointed to the district, also a pure-blooded negro, with whom I was very friendly, as I had known him for a number of years. He was a man of fine character, and remembering the circumstances surrounding the appointment of the chief engineer, most of the Americans took care not to give him offence. Within a month of his arrival he was always the centre of groups of flattering American friends, some of whom genuinely admired him, and I often heard real regret expressed that he had been born a black man by some mistake, for he had a better heart and understanding than most white men.

So it is with the majority of Brazilian negroes. Few of them can read or write, but with the spread of education and under better conditions there is every hope that these

dusky citizens of Brazil will become assimilated with other bloods, until one day they will play a leading part in bringing Brazil to the fore, as did their forebears who helped San Martin fight the Spaniards in the past, or as their fellow negroes have done and are doing to-day in British Guiana, where they established the gold-mining industry, whilst others, as on the Gold Coast, have evoked general admiration (as well as concern on the part of cacao producers elsewhere) on account of the huge quantities of cacao they have suddenly caused to be produced, until in the aggregate, as miners, planters, traders, &c., they have become an extremely valuable asset in whatever centre they find themselves in substantial numbers enjoying an organized and settled industry. This evolution is even now rapidly taking place, and so long as the pure negro is given a fair chance and remains unspoiled and retains his present generous and peaceful characteristics, it is to Brazil's best interests to encourage him to do so in every way possible, whilst at the same time they must attract other colonists, whose temperament and training will enable them to make up for the deficiencies of the negro, but who will, at the same time, collaborate with negro, caboclo, and Indian alike, helping them to help themselves, whilst all assist in developing the areas on which they have settled. Experience proves that the purer the negro keeps, the better the offspring; at the same time, the prejudice against half-breeds is mainly, if not entirely, due, when it is deserved, to the vicious habits of one or both parents of those ragamuffins who, as a rule, cause these undesirables to spring into being. Steady, well-balanced and industrious parents, whether black, white, red or yellow, beget children like themselves, and there are thousands of half-breeds that are a credit to themselves and their country. Being quiet, law-abiding citizens, however, no one notices them; on the other hand, one is forced to

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notice the blackguards, and then say all half-breeds are the same; but this is wrong, and quite untrue.

Marriages between full-blooded negroes, or among people of negro blood, should, it is said, be discouraged as tending to increase an undesirable race, with its want of initiative and expansive power. To this I would answer that "Those who live in glass houses," &c., for it is as well to remember that if the whites did not force their attentions on the blacks there would be no half-breeds; and it must be owned that the Brazilians themselves, as a body, have also shown a lamentable lack of these same qualities in the management of their country. Even if the negro does lack all the abilities expected of him, it does not say that he cannot and will not, under capable white supervision, do as good a work in Brazil as he has done in British Guiana, in Venezuela, throughout the West Indies, the Gold Coast, and elsewhere. As he is a great imitator, should substantial numbers of Chinese and Japanese be introduced and prove successful as settlers, then the Brazilian and alien negro would also probably become increasingly useful in the same way. As he now is, whether negro, mulatto, or quadroon, his lack of ability to "make good" has far more to do with the incompetence of those over him than with himself. Give him the right class of men to show him how to proceed, to keep him within reasonable bounds, and encourage him in his work, and then he will do as well in Brazil as he is doing beyond its boundaries.

CHAPTER X.

THE JAPANESE AS PLANTERS, ARTIZANS, &c.

THE characteristics and qualities which tend to make the Chinese a most suitable means of assisting the *seringuero* of the Amazon, &c., are also possessed to a considerable degree by the Japanese, because, like them, more than one half of the entire Japanese people have been, from time immemorial, dedicated to agricultural pursuits, especially as cultivators of rice, as well as to farming, cattle-raising, &c.

Like the Chinese, the Japs are excellent tillers of the soil, and able to produce very large quantities of rice, even when the soil and climatic conditions are against success. This is important, as rice together with fish should form a much larger share of the daily food of the lower class agriculturist in Brazil, as it is more healthy and nourishing than farine (mandioca or cassava), which is now their chief food. Whilst rice is the principal crop of the Japanese, they also extensively cultivate barley, wheat, maize, hemp, cotton, tobacco, sugar-cane, tea, indigo, sweet potatoes, and other foodstuffs and economic crops too numerous to mention, but all of which should be produced in Brazil as much as possible, not only in the Amazon Valley, but throughout Ceará and other centres with poor soil, where dry-farming and moisture-conserving methods would increase the output and, at the same time, improve the texture and crop-raising

ability of the land.* Most of the crops successfully grown by these new-comers would grow well on the Amazon alluvial soils, whilst they would be most acceptable to the present inhabitants.

As a proof of the successes they have scored during the past decade in developing their own agricultural and industrial resources and to show the undoubted value that the Japanese as a practical colonizing element would prove in Brazil, I will submit a few figures of what they have done in their own country which I consider speak for themselves.

Rice.—In 1912, Japanese planters produced over 50,000,000 koku, or about 157,000,000 bushels of this crop, and their estimates for the 1913 crops were placed at not less than 165,000,000 bushels. Figures showing the developments in the cultivation of cotton, hemp, indigo, tobacco, rape and soya beans have been published, but those for other crops are not yet available, but they are expected to show an enormous increase over the average of previous years.

Sugar.—In 1904, Japan exported sugar valued at £30,000 and imported most of that which she consumed. Against this the total *exports* from her sugar factories (including Formosa, where the industry has only recently been developed) amounted, in 1913, to over £4,500,000, and imports had greatly decreased. The majority of the sugar used in Japan, and also that manufactured for export, is produced from the large sugar plantations of Formosa and Japan proper.

* I contributed papers on dry farming and the conservation of moisture in tropical soils to both the Tulsa and Wichita Congresses on Dry Farming, held in the United States in 1913 and 1914, respectively. The papers are too long to include in this book. Whether the proceedings of the first Congress will ever be published seems very doubtful. I give particulars of the Wichita book on p. 284.—ED.

Fruit-farming, &c.—As fruit-growers they are planting and cultivating oranges, apples, grapes, cherries, plums, almonds, dates, pomegranates, figs, peaches, and a large variety of native fruits, practically all of the above being suitable for cultivation in the Amazon Valley. They have also established a large trade in orchard produce of every description, and in the by-products of fruit-farming. As the Californian fruit-farmer is learning to his cost, nothing short of force will prevent the Jap from holding his own, even in that centre of white perfection.

Cattle-farming, &c.—In 1912 there existed on the farms of Japanese peasant proprietors some 1,400,000 cows of domestic and imported stock, with over 200,000 calves, and special breeding bulls numbering over 6,000; 1,600,000 horses of mixed stock with 5,250 selected breeding stallions; 300,000 pigs, 400,000 sheep, and 100,000 goats; over 20,000,000 poultry, valued at £850,000, and producing 800,000,000 eggs of a total value of £1,160,000; 370,000 ducks, valued at £16,000, producing 7,500,000 eggs, valued at £18,000.

Forest Exploitation.—The felling of forest trees in Japan yielded a total amount of £5,500,000 in 1912; £2,000,000 was derived from the sale of charcoal, £2,000,000 from sawn and cut timber for industrial purposes, and the remainder resulted from the sale of wood for paper, matches, and certain other by-products.

Rubber Planting.—In this they have been very successful wherever they have experimented. They first planted rubber over twenty years ago at the experimental stations in the islands of Ogasawara, a group of about a score of small islands, with a total area of some eleven square miles, situated in lat. 27° N., and long. 142° E. The trees then planted have, in many cases, attained a girth of 4 ft. at a height of only 3 ft. from the ground. They have

produced good quality latex, though not all are *Hevea*, being mixed with *Ficus elastica* and others.

In the Malay Peninsula they have obtained control of 100,000 acres in Johore, but only a small proportion has, up to the present, been placed under cultivation. Part of the planted area (say, 800 acres) is now yielding, but a much larger portion is expected to come into bearing in the course of this year, and the Japs look forward to a rapid increase from 1915 onwards.

They certainly are maintaining their reputation for doing things very thoroughly, as, before extending operations, they sent medical parties to study malaria in the region and to devise means of combating this disease, to which they are very susceptible. No matter what branch of cultivation they have taken up during the present decade, they have met with unqualified success, whether in cotton, tea, or even rubber; but though their success has been enormous, it has been entirely owing to their patience and thoroughness, and, as previously stated, they have had such marked success in rubber growing that the all-in costs on many of their estates are as low as 6d. and 8d. per lb., while estates under European control in the same districts cannot produce at less than 1s. 8d. per lb. Great as has been their success in agriculture, their trading and industrial returns are even more surprising, and although the Japanese trader has, at times, very rightly been accused of dishonest methods, whatever ground there may have been for dissatisfaction, it must be remembered that until recently merchants in Japan had a very low status in the social scale; but with the awakening of the country all this has materially changed and must soon become a thing of the past if the Japanese are to go ahead as they mean to. In the industrial world we find they have enormously developed their mining industries, and coal of good quality is produced from their

which is fairly excellent steam coal. In 1902 the number of native coal miners in Japan was about 80,000, producing nearly 10,000,000 tons, but in 1912 the number of coal miners had increased to nearly 150,000, and production reached about 18,000,000 tons, more than 11,000,000 tons of which were used in the national marine, railways, and by various factories, &c.

Iron, so far, has not been extensively mined in the islands, not having, as yet, been found in paying quantities, though good mines exist in Kamaishi, where there is a large deposit of magnetite.

Good iron-fields are being developed in Korea, Saghalien, and in certain districts of Japan proper. In 1904 the total production of iron ore was less than 50,000 tons, which increased to over 85,000 tons in 1906, but in 1912 decreased to about 70,000 tons, owing to the partial exhaustion of supplies in three out of the five mining districts.

Copper is extensively mined, chiefly in the districts of Akita, Tochigi, and Ehime. In 1906 the total output of copper was about 37,000 tons, worth over £3,000,000 sterling. In 1912 the production reached 60,000 tons, valued at £7,000,000 sterling, and with the development of Korea the output may be expected to still more rapidly increase. *Gold* was mined to the value of £500,000; *silver*, £300,000; *lead*, £55,000; *sulphur*, £75,000; *antimony*, £30,000; *manganese*, £60,000; and other metals on a small scale. Metal mines in Japan employed in 1906 about 70,000 miners, increasing to nearly 75,000 in 1912, and the number of men employed in non-metal mines during the same period also showed an increase from 7,500 to 8,300 men.

Coming now to *oil*, this was discovered in Saghalien in 1907, and in 1911 nearly 80,000 gallons were produced, whilst every indication tends to show that the deposits are large.

has also been of a very noteworthy character, chiefly in cotton-spinning and weaving, a dual undertaking that the Government in Brazil seems particularly anxious to encourage; so that with negro cotton growers and Japanese operatives the Republic should make good progress.

Cotton Yarns.—In 1897 the production of spun cotton in Japan was 217,000,000 lb., obtained from 768,328 spindles, employing 45,000 operatives; but for the year 1912 there were over 90,000 operatives producing nearly 500,000,000 lb. of yarn. Exports of spun yarn totalled £4,000,000, and imports only £70,000, as against £200,000 in 1906.

Weaving.—In 1906, 800,000 operatives produced woven goods to the value of £21,000,000 from 737,000,000 looms, but in 1912, 750,000 workers produced manufactured woven goods to the value of £32,000,000 from only 730,000,000 looms.

Matches.—In 1906 match-making gave employment to 24,000 workpeople, matches of a total of £1,500,000 being made, 70 per cent. of which were exported and 30 per cent. consumed in the country. In 1912 16,000 operatives produced matches to the total value of £1,230,000, and only 15 per cent. were consumed.

Paper-making.—The manufacture of European paper is of recent introduction in Japan. In 1906 only 6,000 operatives were employed in paper factories, producing paper to the value of £1,500,000 from twenty-two factories. In 1912 the number of factories had increased to thirty-six, employing 8,000 employees and producing paper worth over £2,000,000. Apart from these there were 170,000 people engaged in making native papers, of a total value of over £2,000,000.

Wood Pulp.—As is well known, Brazil offers an inexhaustible supply of raw materials of all kinds for paper-

making, an industry in which the Japanese (like the Chinese) excel. The use of wood pulp for paper-making is rapidly increasing in the East, and most of the wood is obtained from the forests of Japan, Formosa, and Korea. In 1908 nearly 87,000,000 lb. of timber were used, but in 1913 250,000,000 lb. of timber were cut down in the forests and converted into paper. As Brazil offers an inexhaustible supply of raw material for this industry, which is one that could with advantage be developed to its utmost, the Brazilians would do well to include some Japanese, who have had experience in the manufacture of paper pulp, among the immigrants [especially as the War, as the *Times* reminded its readers a little time back, will cause the paper-maker to turn his attention more closely than ever to other sources of supply for raw material with which to make paper. Present supplies of wood are not inexhaustible and the demand for pulp, on the other hand, has increased so vastly that it is now estimated to account for the destruction of about half a million trees every year, and the tendency is for the demand to increase whilst present available sources of supply are inclined to shrink. South Africa is urging the claims of a certain Tambuti or Tambookie grass, said to be *Cympogon validus*,* as a paper-making material. This grows profusely throughout certain districts of the Dominion and "distinctly encouraging" reports have been issued on it for such a purpose, and this being so, it would be interesting to know what the paper-making experts would have to say of the Amazon grasses, which at present are of no use, and often a nuisance and a danger when floating adrift down stream.]

Other important industries in Japan are the manufacture of porcelain and earthenware, worth £1,600,000; camphor,

* *South African Mining Journal*, September 12th, 1914.

refined and crude, £240,000; camphor oil, £115,000; indigo, £65,000; soaps, £500,000; peppermint and by-products, £300,000; silk spinning, £4,000,000; and a number of others of less importance, including dyeing, lacquer work, straw-plaiting, &c. The exportation of raw silk for manufacture (an industry that should do well in Brazil), is of an annual yearly value of about £13,000,000, being about 70 per cent. of the total raw silk produced, the remaining 30 per cent. being spun into fabrics for home use and export.

The fishing industry of Japan has also been enormously developed, and we all know how badly Brazil needs to do the same. It does not seem many years since Europeans thought of the Japanese as only fishing with cormorants and by hand-cast nets. Owing to their position as an island race they have always been experienced fishermen, and fish, with rice, has for ages been their staple article of diet. This excellent food would be most advantageous to the *seringueiros*, especially as the rivers seem to abound in fish. It was not, however, until towards the end of the nineteenth century that the Japanese fishing industry had any real opportunity for development; this was mainly due to the restrictions placed upon the building of ocean-going ships. To-day Japanese fishermen are to be met with in all the southern seas, the Arctic seas of Siberia, and the Pacific coasts of the United States and Canada, and this being so, what more welcomed and experienced a race could Brazil attract to her shores and up-river districts. In Korean waters alone, Japanese boats capture fish of an estimated yearly value of about £5,000,000 sterling, and employ over 10,000 fishermen with over 2,000 boats. About the same number of fishermen get their livelihood off the coasts of Saghalien and Siberia, and over 250 boats are employed in salmon fishing in the Fraser River and elsewhere.

Not only in fishing itself, but in the exportation of the

£1,000,000 per annum, the bulk of which is with China. The principal exports are salted and dried fish, fish guano, and salted prawns; whilst, with modern oil-extraction apparatus and the help of the vacuum dryer, fish oil and fish manure can be turned out with the minimum of cost and annoyance. In connection with the fishing industry they have also developed a valuable trade in such marine products as seaweed, shellfish, &c., until the total value of the fishing industry in Japan now amounts to over £8,500,000, and employs 700 modern steam and sailing vessels, built on European lines, and nearly 400,000 native sailing craft of all sizes; in fact, during the last ten years the annual value of the industry has practically doubled. If this can be done in Japan it certainly could be achieved in Brazil. The Japanese are excellent and very experienced fishermen with harpoon, lance, line, trap, or cast net, as these are the instruments they most generally employ in their rivers; in fact, the river-dwellers are accustomed to fish by using the same or similar methods as the Indian or Amazon river-dweller, only he uses them to greater advantage. Practised in the making and using of bows and arrows they would quickly become adepts in turtle fishing, and would, without doubt, rapidly increase the output of river turtles as well as of fish from the Amazon and its tributaries. Splendid boatmen, they are also accustomed to boat building and sailing from infancy.

It must be remembered, too, that while Japan is enormously developing her natural resources and industries in a way that Brazil wants to follow, China is waking up to do the same; and though at the moment it might only be convenient to allow them to enter the Amazon as agriculturists and peasant farmers, both the Chinese and Japanese would in time become of enormous value as fishermen and in the opening up of mining and other industries.

unexploited wealth ready to hand and only awaiting the arrival of intelligent brains and experienced hands to develop them; and although a few "standstills" have declared that she does not want cheap black or yellow labour, these illimitable resources will never be developed and made the most of without such help, as, so far, Brazil has proved herself to be powerless to move forward and become self-supporting. Until she does so her ability to pay her way, and to give up living on borrowed capital, instead of current revenue, will never be developed.

Europeans cannot yet be expected to undertake the trials and risks of developing and colonizing the Amazon in its present state. While many of them are no doubt excellent farmers and industrials, they cannot withstand the rigours of tropical pioneering, especially on the lower lands [and even the Orientals themselves will probably suffer until they can learn to clear, to drain, and to cultivate the damp soil, and by means of rice and banana crops to render it generally less damp and more healthy. What the tablelands of Brazil will prove to be like when opened up and rendered accessible, I cannot say. Similar plateaux in British Guiana, I am told, have proved too poor to be attractive, all the humus and rich soil having, apparently, been washed away down the rivers or deposited in the valleys. If this is so, Brazil and elsewhere, when clearing tablelands of forest and bush-growth, should see to it that the ground is not exposed injudiciously and that the trees and bush to some considerable width are left along the edge of ravines, so, as far as possible, to keep the surface soil on the top of the plateaux until the crops are planted, and thus prevent that serious wastage of valuable plant-food that has resulted in British Guiana. In cases like this how valuable could the Chinese and Japanese, but especially the former, prove, since they waste nothing and are adepts at damming up the water, or avoid-

ing soil erosion, since the loss of these in their own country would often mean poverty if not actual want to the small agriculturist in the Celestial Empire. Summing up, therefore, what does Brazil need, is it not trained labour to develop her forest industries, organize her river and ocean fisheries, cultivate her lands and feed her people, open up her mines and build up local industries, whilst generating an oversea trade? This is what Brazil wants, and what the Chinese and the Japs—with the help, in time, of their own and of the Brazilian women—can give her; or if not them, who can you suggest to take their place?]

Negro and negroid races have been suggested as a possible solution of the very difficult labour problem, but though those of Brazil are peaceful, orderly citizens, they are better suited for a life of good-humoured laziness than for the demands made upon all who undertake the trials of pioneering, agriculture, and the development of natural riches. Up to now, however, maybe the example of others around them may not have encouraged ideas of energy and ambition; but once given an army of steady, plodding men in their midst to compete against, there is no saying what the Brazilian negro and mulatto of the next generation, if not of this one, is capable of achieving. This, therefore, is what must be done; the white races cannot and will not go to the Amazon as labourers and peasant proprietors; the country itself has not enough men, and those that she has are neither able nor willing to put forth the required effort. It seems clear, therefore, that Brazil must choose her new immigrants and industrials from among those who have had experience and training in those industries which need developing, and who will readily become accustomed to the climate, whilst their present home life fits them for the labour which will be required of them, not only to immediately relieve the rubber situation, but also to rapidly and intelligently

develop new territories without the intervention of large bodies of capitalists or industrial corporations; [for what Brazil mostly needs at the present time is to develop just that class of small agriculturists and traders which have made France so powerful and enabled her to rise triumphant above the brutal materialism of the Teuton. It is no longer her ability to borrow and spend vast sums on railways, on river and ocean steamers, docks, on more or less questionable company promotion schemes, &c., that will make Brazil contented and prosperous; to-day she requires to draw not millions of money, but millions of small agriculturists and traders to her shores; first, perhaps, to develop her raw rubber industry, but equally to grow those supplies of food-stuffs without which the rubber gatherer can never put forth his best efforts; whilst other industries, subsidiary as well as independent of the rubber industry (cotton growing and manufacture, stock-raising and leather tanning and working, lumbering and wood-working, the production of vegetable oils, &c.), must be built up to bear their share of the Republic's taxation, and so relieve the burden that is now strangling the rubber output.]

The business attributes and characteristics possessed by the Chinese and Japanese are in a very marked degree, and require no further enumeration on my part, being well enough known and recognized by men of experience to enable the rulers of Brazil to realize that the yellow man is not a "snake," but one who has the ability to advance the welfare and the industries of the Republic to a degree that even exceeds the white man, since the Orientals can, to a large degree, do the work themselves, and they are certainly far ahead in most points of many of the present rubber collectors and their fraternity on whom Brazil has now to depend as her "hewers of wood and drawers of water."

That they are capable of developing new industries has

been well proved, and in order that it may be possible to better appreciate their suitability, I will ask the reader to examine the conditions under which they live and the influence that their home life and training would have on new industries in Northern Brazil and the Amazon, if means can be found to get them there as settlers in large numbers.

Think of the industries which have been so remarkably developed by them at home, and then let us look at the promises they offer in the two which Brazil is particularly anxious to develop at the moment, viz., cotton growing and spinning.

Cotton growing has been attempted in Japan, and is probably their only serious failure as planters, though they are hardly to blame, for not until the forests are cleared can Japan hope to find suitable ground for the purpose. Climate, soil, and a variety of other circumstances have made successful cotton growing impossible up to the present. This is no reason, however, why they should not cultivate and grow cotton (hemp, flax, and other suitable fibres) in Brazil, but quite the other way, as the experience they have gained in their failures at home will stand them in good stead in Brazil and prevent their making such a mull, as at least one concern has recently made near Natal (in Pernambuco), where a serious attempt is said to have been made to grow cotton in exposed sandy soil.

Cotton growing has already been initiated in certain States and is doing well where the soil and other conditions are suitable; and, as everyone knows, the cotton mills, where erected in Brazil, are prospering, though to be a success on a national scale the cost of the finished article needs reducing. Here the home training of the Jap would make him suitable for the rapid development of an industry which is badly needed, and which, being already started, has, therefore, good prospects of ultimate success.

Rice also has been profitably grown in the valley of the Amazon to the advantage of producer, consumer, and land alike, whilst the conditions should ensure good crops in North Brazil. Nearly every village Jap understands rice planting and growing, and as it is a well-known fact that rice does well in Brazil with comparatively little attention, the introduction of the Orientals to the Amazon region would ensure her rapidly becoming one of the world's chief producers, and not of rice only but of soya beans and other foodstuffs as well. If Japan, including her newly acquired territories of Formosa and Saghalien, with an area of 177,460 square miles, can produce such quantities of rice, surely the States of Pará, Matto Grosso, and Amazonas could, given adequate supplies of the right class of labour, produce a similar quantity, when it is remembered that the total area of the latter State alone is almost as great as that of Japan.

The introduction of sugar growing among the Japs on an extensive scale, if of recent date, has been conducted along scientific lines, and by means of some of the latest types of machinery. Though there have always been large sugar-cane plantations in Japan proper these have not been conducted on the up-to-date lines in vogue in Formosa. Since the acquisition of that island sugar growing and refining have been enormously developed there, so that here, again, their training as sugar producers and manufacturers, &c., would render them valuable on the Amazon, where sugar has been tried and grows well; but although this is known, and in spite of the cost of local supplies (15 cents, or 7½d. per lb., in Pará, according to Algot Lange, see p. 15), no serious attempt has been made to cultivate it in Northern Brazil, except for the manufacture of *cachaça*. What a change, therefore, could be expected in the course of a year or two if only five hundred Japanese families were settled on suitable land for sugar cultivation.

As fruit farmers they would also be of enormous value, and also as packers and exporters of canned fruits and meats, &c.; the *seringueros*, more than anyone, would benefit from the development of such a trade. For this reason alone they would, without doubt, soon justify the erection of canning factories, whilst an export trade to the neighbouring States and Republics could be made most remunerative. Experienced also in the extraction of fruit juices and vegetable extracts, they could reasonably be expected to become successful fruit growers on the Amazon, even when the local market could not absorb all they produce. Travellers up the Amazon, and, in fact, to any part of Brazil, know the exquisite quality and flavour of most of her uncultivated fruits, but it would be easy for the Jap to make them known to the whole world; while the facility with which they could grow sweet-smelling flowers, and collect those from the forest, would ensure the birth of laboratories for the making of perfumes, new ones as well as the old favourites, in which they are also adepts, and for which the Latin American, male and female, is, next to the *demi-monde*, perhaps the largest and most regular buyer. No actress has her dressing-table covered with such a collection of scents, waters, "face-improvers," as do some Latin Americans that I know.

Of all the nations, none is more artistic in the cultivation of shrubs and flowers, and I should like to see my old friend, Mr. Iida Sohichi, establish a branch of his Yokohama nursery business in or around Manáos. The forests of the Amazon, which are admitted to be the richest in the world in their floral wealth and beauty, would provide them with material for the formation of experimental gardens and for carefully organized collection, reproduction, and exportation of the Amazon's richest gems for the decoration of botanical gardens and the adornment of city homes all over the world.

[Coming to cattle, the home training and life in

agricultural villages in Japan would fit the men and also their families to attend to the breeding of cattle in Matto Grosso and along the Amazon, both States offering excellent opportunities for cattle raising, and once the start was made, I will be bound that the animals would not present the neglected, long-legged, lean and wild appearance that Lange reports of those he encountered, though they seemed to be as well or better off than the *vaqueros*, or "cattlemen," all of whom seem to be sick and miserable, without life and energy in their thin, emaciated bodies. The cattle, however, are of poor quality, often infested with "fly" and other pests to a degree that too often ruins their hides, whilst a large number of calves are needlessly lost, and their mothers often find it difficult to secure the right variety of grass as feed, so that, in venturing too far into the water in search of what the poor beast needs, its udders are liable to be snapped at by the dreaded *piranha* (known as the man-eater) fish, until it is rare to find a Marajó Island cow that has not got its udder mutilated from such bites. What an unnecessary amount of suffering to man and beast alike is thus caused; think how different the lot of these cattle could be with a little management, even on a ranch like old Leopoldina Lobato's, said to contain 65,000 head; like the rubber and every other industry in Brazil, cattle ranching needs to be radically reformed before it can really benefit either the ranch-holder or the Republic. For an owner possessing vast herds, or the *vaqueros* under him, to "exist" (not live) as some of these Brazilians seem content to do, proves more than anything else how completely out of date the country has become, and the need that there is for those wishing to trade with Brazil, first to put her financial affairs in order, and then by making her internal trade develop as it could and should do if given a fair chance and a sufficient supply of the right class of agriculturists and estate labourers, to create

that demand for estate and home supplies that could be developed throughout the Valley. Look at their success in pig rearing and with poultry, goats and sheep, and think of what the Amazon would be if part of her forests were cleared of their unnecessary and dangerous undergrowth so that animals could pasture in the shade of the rubber trees, whilst the owner tapped them and did his usual routine work. All this is open to Brazil, and the Jap has the necessary knowledge and practical experience to make farming and cattle raising successful under such conditions.]

Each of the above agricultural pursuits, however, are dependent upon the clearing of forests and the drainage of the land, but having previously shown the value of Amazon timbers,* and the possibilities which the forests offer in the exploitation of by-products, let me repeat what the Jap has done with his own, whilst reminding the reader that forest exploitation in Japan as an industry is but a few years old, but so far as it goes they have made a "fine art" of it, whereby nothing is wasted, until, probably, even the skin and the oil in the thousands of snakes that infest Brazil is likely to be utilized by these thrifty folk.

In 1912, the Japanese obtained in sawn timber £2,000,000, for wood pulp £2,000,000, and the sum of £1,500,000 was obtained from the exploitation of barks, leaves, extracts, bamboo, clog soles, cart wheels, and a multitude of other purposes, all widely different from the exploitation of the forest and wood lands. Did ever any Brazilian, or any immigrant for that matter, see a trade in clog soles made *in the forests*? Then if he did not, why not allow the Jap

* Mr. Algot Lange, to whom reference has so often been made, has specialized as an expert in Brazilian timbers. Those, therefore, who are interested in this branch of work should communicate with him, care of his publishers, Messrs. G. P. Putnam's Sons, of New York and London.—ED.

to come in and show how it is done. Clog soles, spokes for wheels, wood for matches, charcoal and alcohol, wood pulp for paper making, shavings for hat making, &c., rank grasses for straw plaits, all these and many other small industries are part of the daily life of many Japs, so that there can be no doubt that they would rapidly and easily turn their attention to similar profitable pursuits in the Amazon—and with what profit to that area! Possibly with their aid we should, in time, see the main by-streams less frequently clogged with the *cana-rana* and *mururé* grass that Lange complains of, owing to great clumps becoming detached and floating away down stream like pack-ice, and, in the same way, they tend to block up the river and render navigation dangerous, if not impossible.

Like the Chinese, the Japanese are used to mining, and so would probably assist as financiers and actual miners in the exploitation and working of the vast mineral deposits of almost every description to be found throughout the Republic. Coal undoubtedly lies under the huge forests in the high lands of the Amazon Valley, while copper and lead are common in many districts, where I myself have seen the outcrops. One region in particular, which is in very bad repute as a rubber-producing centre, contains many square miles of hilly ground, consisting almost wholly of copper-yielding bases, whilst one can get a "show" of gold in many a pan of sand from the most insignificant stream. Another region has been mined, as an experiment, for coal, but the mineral was not found in paying quantities and the quality was poor; under other conditions, however, different results may be looked for. The shale deposits of the region show that in the future the district will surely produce oil. Lead, in a certain tributary of the River Madeira, can be picked up on the ground, and not far from it graphite undoubtedly is plentiful. Gold and silver may

be found in many rivers, not to mention precious stones. Keen investigators like the Japs will never be satisfied to only talk of the possibility of finding these treasures, but would find out everything that is worth knowing about the ground, both above and below, in order to render the working of them profitable, to the benefit both of the State and to themselves. Minas Geraes has, of course, immense mining possibilities, which when properly developed could afford to "smile" at the taxation that is now breaking the back of the rubber industry.

In concluding this section, I would like to say a word about what, for want of a better name, I will describe as the "Colonization Zones" of the Republic. Brazil is divided into three distinct climatic zones: (1) The temperate one of the south, which alone is suitable for European colonization on a large scale, has a fine climate, and a mean temperature of 63° F., with a rainfall in winter and autumn averaging between 40 and 60 in. (2) The subtropical zone, which includes Rio de Janeiro, is suitable for the Latin people and many Europeans, since it enjoys an average temperature of 74° F., its disadvantage being the heavy rains that are usual from November to April, the average for these months being 44 in. (3) The tropical zone, including the Amazon and the greater part of the State of Matto Grosso, with a mean temperature of 77° F., but with so heavy a rainfall, coupled with the damp soil and moisture-laden air, that renders it habitable only for natives of hot countries, and none too healthy for them.

If white races cannot thrive along the Amazon, black races can, and their status, as well as that of the Indians and half-Indians, could be vastly improved in time, at comparatively little cost, once given the population necessary to develop the country around; and if the Indians, pure or mixed, since they have proved suitable, could be induced

to come out more into the open and do their share of planting and development work, splendid progress would soon result, and smaller numbers of Orientals would be needed. At present, however, neither the (so-called) Portuguese (*caboclos*) nor Indians are numerically strong enough to sufficiently populate the Amazon, even if the whole Portuguese nation were to mix with the Indian races. We must go East for supplies.

That the backward Brazilians will continue to oppose Oriental immigration, in spite of all the advantages which would be derived from it, is a matter of little doubt. I trust, however, that, with the help of the creditors outside and the more broad-minded, far-seeing, and also less selfish Brazilian at home, she may be able to, and I think will, save her rubber industry and retain her superiority by the efforts of her own people, coupled with this aid from outside. If this does not prove correct, I cannot see any other way open for her if she desires to develop her national stores of wealth. Those, therefore, who wish to oppose a judicious immigration of Japs and Chinese, and an open market for honest English capital and trade, with no opportunity granted for purely company-promoting monopolies and concessions, will do well to hesitate before they allow their ill-timed influence to bring matters to a climax, especially as it can only be a climax that will go against the prosperity of the Republic and themselves.

These views of mine may give offence to many people in Brazil, but I have written what I feel, and believe to be right, and because I have a deep appreciation of what the Amazon is and could be. In doing so, therefore, I honestly believe that I have acted in Brazil's own interests, as well as of those of the civilized world in general.

CHAPTER XI.

THE CHINESE.

FOR years the cry that has gone up from Brazil has been for more labour, and the stock excuse for failure to develop her industrial pursuits and agriculture has been the *falta de braços* (lack of hands). In spite of this, however, any organized scheme of Oriental immigration on an extended scale has met with strong opposition. I am reminded of this by reading the eulogistic report, I would almost like to call it the picturesque fairy tale, contained in vol. ii of the Journal of the "Superintendencia da Defesa de Borracha," dated June 30th, 1913, wherein, after referring to labour and fiscal problems in the rubber industry, a contributor goes on to state: "The development of the Amazon from a state of trackless forest to the relatively high point of civilization reached by the States of Pará and Amazonas has been effected by the indomitable perseverance and initiative of exclusively national elements, recruited from the North-eastern States of Piauhy, Maranhão, Ceará, Rio Grande do Norte, and Parahyba. This race has proved its aptitude for both moral and material development, and it is upon them and not upon any other alien, in race or ideal, that Brazil must count for solving this problem."

[Will anyone outside Brazil confirm these statements? Can any of those who, in these days of war-taxes and dearer food, suddenly find themselves also deprived of the income

to which they are entitled for loans sent to develop Brazil's resources and to maintain such men as the writer of these high-flown but empty words, be expected to agree that Brazil is anything else but a backward nation, inclined to go, in face of the strenuous competition from other centres, from bad to worse? Do we not all know that, with but few exceptions, and those probably either foreigners or with a large percentage of foreign blood in their veins, even the Brazilian cacao industry is playing second fiddle to San Thomé cacao, and is inclined to be cut out by the negro native-grown cacao on the Gold Coast, just across the Atlantic? Is it not true that the Republic, whose admirer so loudly exaggerates her achievements, cannot pay her way, and yet, left to herself, proposes to go on borrowing money and to continue to pay her debts by borrowing more money, instead of paying her current expenditure out of current revenue?]

This shows the prejudice of some Brazilians against other and more useful races, and their Latin legacy of impulsiveness and fickleness, for in reading the above paragraph in the Brazilian journal it can be gathered that the contributor presumably voices the opinion of the Association formed by the Government to discover means of saving the rubber industry of the Amazon from destruction, but which, so far, has so signally failed in its object.

This is not to be wondered at, since nothing has been done to usefully follow up the first steps, whilst enormous sums seem to have been spent without any real advantage accruing to Brazil, and so long as those who finance Brazil are content to allow the Brazilians to continue to play this delightful game of "Hunt the Slipper" (the slipper being the last loan which was to have been floated last year but fell flat on account of the War) to see who can get the biggest grab at it, nothing advantageous will ever result.

Such sentiments on the part of the Brazilians may, at

first sight, seem to be a splendid resolution, and on the face of it show great devotion to and a pride of race; but its value as such is greatly diminished when one knows the results and then goes on to read the paragraphs succeeding, sentences running as follows, which should prove particularly interesting to those Brazil owes money to at the moment: "Better, even, that the rubber industry should sink and disappear, than that the future of a region pictured by Humboldt as the 'hope of humanity' should be sacrificed. The immigration that Brazil desires is not one of slaves or cheap black or yellow indentured labour, but of men and women who can be trained into useful citizens with ideals, social and political, *similar to our own*. When Americans, Canadians, and even the South African Republic, repudiate the yellow races, why should the *Times** imagine that Brazil will be less patriotic?" I, at any rate, do not suggest that indentured labourers or slaves be sent to the Amazon, as the rubber industry there has already claimed enough victims in the less accessible regions; on the contrary, what Brazil needs is free settlers and small farmers, &c. Perhaps, however, it will not be difficult to show that Brazil must have the assistance of the black and yellow races which she affects to despise and condemns without experience, possibly because the influence of "capital" and the company-owned concern has brought them into bad odour in other parts of the world.

I do not intend to enter into any diatribe on capital and labour, but since Brazil has to pay her way and shows no signs of being able to do so unless she obtains a further loan, I hope to show how the Chinese or other small-holders and independent peasant proprietors would be of great service in the future agricultural development of the

* See *Times*, South American Supplement, March 20th, 1913.

Amazon. Whether farming by means of irrigation and moisture-conserving methods (commonly known as dry-farming), or in mud lands and swamps, no matter what the ground is like, the Chinaman, who is accustomed to such extremes in agriculture, will, by patience and natural practical insight, rapidly overcome all difficulties. He therefore offers just the type of man that Brazil needs and must have, and for this reason it is much to be regretted that the agricultural and industrial methods and capabilities of the Chinese are so little known and appreciated by the Western people. This ignorance, however, might easily be overcome by those whose prejudice is not merely due to selfish interests, if books on the Chinese and their methods were published in Portuguese and distributed among those who can read, and discussed when opportunity arises with those who cannot, for there is no doubt that the more nations know of one another the better the relations which spring up between them become, and, on that account, the risks of misunderstanding owing to racial prejudice tend to decrease.

In view of this it is greatly to be regretted that for more than one hundred and fifty years the want of real knowledge of each other's good points has prevented the East and West from becoming better known to each other. As the East, however, as a rubber producer, is bound to come to the front, Brazil had far better bow to the inevitable, and, as the white races have done in the case of the Japanese, she will, if she is wise, acknowledge the East as an equal, especially as, *pro tem.*, this rival has the better of her as a producer and exporter of rubber. Also, if she wishes to catch up with these rivals she, like them, must "go East" for her labour, and copy the methods in vogue there for feeding and housing the masses.

It cannot, of course, be hoped that societies which have been formed for the purpose of making the advantages of

the Oriental better known in Brazil can readily or quickly accomplish all that will have to be done in the way of carrying the educational propaganda to a complete success; this can only be done in the course of time and by personal acquaintance. At the same time, Japanese and Chinese emigration societies can do much good by assisting Eastern immigrants to make new homes in Brazil and in showing the Republic the advantages of having them there as free colonists, labourers, and peasant proprietors.

Human nature is the same all the world over, and with the spread of education in the East less is heard to-day of the superiority of the white races in colonization and trade development, and so it will be in South America once they have grown accustomed to the Orientals.

The liability to err is as great among the Western races as among the Oriental, or for that matter, any other race, no matter what its composition or degree of enlightenment, so that the fallibility of human nature will continue to be as great a factor in the future as it has ever been in the past. Here in the West, among ourselves, we have alliances, not forgetting the *entente cordiale* with a nation which in Nelson's day was hated by every patriotic Englishman, and of which until quite recently comparatively little was really known by our "man in the street," although France is at his very door.

The emigration of the Chinese to Western sub-tropical and tropical regions can only be a question of time, in face of the rapid expansion going on throughout the Chinese Republic; for, in spite of the set-back of conflicting local interests, the general public in China, as in Russia, move forward slowly but surely, and all the reactionaries that ever existed can keep neither of these people back for much longer.

The old ideas of Englishmen that the Chinese were of an extremely bizarre character, which placed them on a

different plane to all other peoples, has now almost entirely disappeared, except among the uneducated, because untravelled, masses. Those who know and have traded with the Chinese find them reliable and straightforward. If Brazil as a nation, and including all classes, can claim as good a record, she can well be satisfied with herself.

The Chinese have a great love of progeny, which has led to over-population in large districts, but which in turn has caused a strenuous struggle for life and made extraordinary industry absolutely necessary to them. All these circumstances combine to make the Chinese frugal and thrifty and so cause them to be even more ideal as a colonizing and populating people in Brazil. Again, rice is cultivated by them, in face of great natural disadvantages, on a scale which no other race has attempted, and I have more faith in the rice field and soya-bean gardens for resuscitating the people of Brazil and its various industries than all the "Defesas" ever thought of. Like the Japanese, and perhaps more so, they are practised in all branches of farming and agriculture, particularly the cultivation of cereals, maize, tobacco, fruits, and vegetables, and are competent cattle, horse and pig breeders, and as such have materially assisted in the development of the French Indo-Chinese colonies, a centre which offers a valuable object-lesson to the West; whilst throughout the East and also in the West Indies, as already stated, they have planted, traded, and mined for many years past.

[The drain on the States of Brazil outside the hevea rubber zone, especially Ceará, for labour supplies to tap the rubber cannot go on much longer, and then what will the *estrada* owners do? As it is, the supply is precarious, a good cotton crop at once causing it to shrink, whilst the lack of residents over large areas is causing waste areas to be extended, and semi-fertile lands that could be saved and utilized with a

fairly close population will go from bad to worse, until they become as useless as the barren veldt, if not the Sahara Desert, in Africa. On the other hand, when one remembers what has been done in the dry zone, and round Utah, in America, it seems a great pity that the senseless prejudice on the part of a few Brazilians should cause vast areas to go out of use when a race like the Chinese could possibly do great things with it—do great things, that is, if their advent is not delayed too long. If at first it is impossible to “plant up” the Amazon because of its chronic dampness and heat, then let the Chinese squat over Ceará, Matto Grosso and Rio Grande do Norte and produce there, as near the rubber belt as possible, the foodstuffs that the *seringuero* and the Brazil rubber industry so sadly need.

All this brings us to an extremely important, one could truly say the most important, stage of this controversy, as to whether or not the supremacy of the Amazon rubber industry can be maintained in competition with the East; a stage, too, in which the Chinese cultivator would, of the two races, Chinese and Japanese, probably play the most important *rôle*.

As the world wags to-day, Brazil could easily hold her own against all comers if she organized the exploitation of her forests and the tapping of the rubber trees to be found therein to become a subsidiary industry of the *seringuero*, and not, as now, his main and generally his sole means of existence; and this could especially be the case with the opening up of new state-owned areas, of which we have already spoken, with the 300,000,000 trees estimated to be still untapped. Utilizing this area, the authorities will not come into conflict with those claiming vested or contract rights, but will have a free hand to rent or share the area out as seems most fit, according to those undertaking to clear the land and work the trees.

With the sum voted or subscribed, as suggested (on p. 115), the forest areas could be slowly cleared back from the river banks, and the lianes, small bushes and trees burnt wherever spaces were found wide enough to avoid any chance of harming the rubber trees. As things now are, it may seem doubtful whether the "bush" will ever be dry enough to burn, but I take it that at times the sun ~~does~~ shine, even in the forests of Brazil, and if a start is made on the duller days and the trash is spread out or heaped up to dry, surely in time, when the chance comes, a few acres can be cleared, the land then drained and planted, first with rice, bananas, or other "greedy" crop capable of "sweetening" and partially draining the soil, and, at the same time, of feeding the planter. Other crops to follow will be discussed further on, but at this stage it seems feasible to discuss some such idea to begin with, choosing at the start the most easy-to-drain spots, and then extending operations in time to some of those snake-infested *ygapôs* or swampy creeks, and between the clearing, the firing, &c., to get rid of these and other pests before the march of civilization. Where a man can live he can cultivate—if he cannot, he should not live in that spot, and surely there are some higher spots on his *estrada* than one that is always swampy or under water.

We take it, therefore, that the rubber gatherer of the future, be he Chinese, Jap, *Caboclo*, or pure Indian, is to be better looked after, especially on the State-owned areas. In the more favourable spots they can probably erect their houses (which are to be properly built with weather-proof sides and roof, and a good plank floor, with the boards touching and fastened down, either by wooden or iron spikes) and clear the land at their own expense, whilst elsewhere, if the clearance is too difficult, the Government may pay a portion of the cost. Again, in every instance grants may

be advanced, so much a month in the same way as wages, and the amount, or part of it, recovered as the settler is able to pay. Meanwhile, the tapping of the rubber trees is not lost sight of. Given the land free of cost, and assisted (or not) to clear a portion to build his house, and so become a valuable asset to the community, our settler, leaving his wife and family or dependants to attend to the house and cultivations, can go his round and tap the trees under a profit-sharing agreement with the owner of the trees, whether a private individual or the Government.

Those who know the *seringuero's* life now, tell you that his lot is so hard that he can do nothing in the way of cultivating the soil, or even manage to build a weather-proof house; if this is correct, it only goes to prove how very rotten are the foundations on which the, at present, tottering rubber industry of the Amazon Valley is expected to stand. Some of the men, at least, are not so ground down, and I do not believe that there is the necessity for any of them to be reduced to the straits some undoubtedly are through bad management on their part, or by trying to tap too large an area and being overworked, or for other reasons.

Remove the necessity, therefore, for this tissue and health-exhausting life, and watch how the man and industry alike will go ahead. This surely can be achieved by placing the tapper on cleared areas, where he can grow his food, tobacco, sugar, &c., and so avoid having to buy them at outrageous prices, and in thus reducing the cost of living he will not be forced to cover so wide an area in his daily round of rubber-tapping in order to get enough rubber to satisfy his creditor and so merely to exist, and not always that. In the same way as "contractors" plant cacao in the West Indies, especially in the Island of Trinidad, whilst cultivating the soil and keeping their families in comfort and health, so should the well-organized settler up the

Amazon be able to do likewise, only tapping the rubber instead of planting the cacao. In time such *seringueiros*, like the cacao contractors, can become landed proprietors, especially if an agreed sum per rubber tree is paid him at the end of three, five, or seven years (as is done with cacao) for every rubber tree of an agreed age that he has isolated and cleared of growth, so that it can be worked and tended in the same way as the famous trees at Heneratgoda are worked in Ceylon (*see* illustration facing p. 33).

Tobacco, sugar-cane, maize, taniais, rice, bananas, and many other crops, even coffee, could, of course, be quickly raised in this way, until (as suggested and as the population increased, with the more healthy conditions then prevailing, coupled with a steady flow of immigrants from elsewhere) these settlers would become substantial and contented small-holders, whose output of rubber and, in time, other produce, added to their purchasing power when ordering imported cotton and other goods, would in the aggregate add large sums to the commerce of Brazil, whilst by the more widespread taxation and the State's share of the rubber obtained they would substantially increase the revenue of the State and the Republic as a whole, whilst bearing less heavily on the individual *seringueiro* or shipper.

Sugar-canes should also be grown, even if only a few stools, as they come in useful for sweetening by means of the juice, not, of course, at first on the small-holding or homestead, for making sugar. A good plan at the start is to cut a square hole (about 3 in. wide by 5 in. deep) in a fair-sized tree, the lower side sloping to the ground, sometimes with a piece of tin nailed on and the end pinched up to form a spout. The piece of cane is then thrust in under a long squared beam, made smaller than the hole (say $2\frac{1}{2}$ by 3 in.), and the piece of wood pulled down by hand on to the cane subjects it, of course, to considerable

pressure and causes the juice to run down the tin into a basin or other receptacle. As the man works the beam with the right hand he can push the cane further home with his left, or one person can work the beam and another the pieces of cane. In this way a pint, quart, or more, of cane juice is quickly obtained.

With the development of the Amazon and the re-organization of the *seringals* on the lines just suggested, better supervision could be given to the methods of tapping and preparing the rubber, and as time passes and the *estradas* are joined up one to the other, a central *defumador* could be erected, and the older, if less active, folks could smoke the rubber, whilst the more agile ones could collect the latex. A collection of such *defumadores* would soon lead to a modern factory being installed, which means far less wasteful labour to the tapper, and far more dependence on supplies for the owners.]

Such settlements, whether of individuals or families, will, of course, become valuable, and new-comers, in case of the death or removal of a former occupant, could "buy themselves in" by paying to the owner, the State, or the late occupants, an agreed sum, either cash down, or by instalments, for "goodwill and improvements," including the house and cultivations. If on Government land, the State could pay the outgoing tenant or his heirs and collect the amount in its turn from the new-comer. In this way these centres would be rendered more healthy, because it would be to the interest of the tappers to keep them clean, and even to go on improving them so as to obtain a larger amount from the new-comer, and with the money thus obtained, *plus* any savings they may have put by, the men can secure holdings of their own. With this bait dangling before them, the most indifferent, "peonage bound" *seringuero* is likely to wake up, especially when they see the

Chinese and other immigrants comfortably settled on their own patches.

Why should not the *seringuero* be obliged to maintain their *estrada* and homestead in good order, and keep his cultivations up to an agreed standard. He could do so to his own benefit, and that of the State at the same time. Whilst he is away, day by day, collecting his latex, he could engage the help of new-comers, who will need a little preliminary training, to cultivate the land and even help him with the tapping and smoking of the rubber, thus leaving the *seringuero* more time to develop things generally. Six months' training, or perhaps twelve, so as to get the round of the seasons, would be the making of the new-comers, and at the same time give the established *seringuero* a very acceptable leg-up in establishing himself. The Chinese would be very suitable in this work. Steady workers, they would help their employers loyally, and being shrewd men of the world, they would learn much and lose sight of nothing. If the *seringuero* is a Brazilian, all the better for him, as the Oriental could and probably would teach him as much and more in six months about draining and cultivating the soil than the Brazilian, as a rule, learns in a lifetime as things now are. Surely the leaders of thought in Brazil, and the financiers of her industries, would do well to consider some such plan, and instead of creating an agitation against the Oriental, utilize him to raise the lower-class Brazilian to a higher plane, both socially and financially. If only by giving him that much-sought-after luxury, *braços*, the Brazilian would be relieved of some of his over-taxing labours; but to obtain this luxury the Brazilian must bear a good character generally and not be a bully or a profligate, he must also have established himself and his *estrada* up to a certain standard, with a well-organized "round," and his lands properly cultivated and

drained. The new-comer is to be a student, not the slave of a slave; and, of course, he need not be, in fact, he should not always be an Oriental. As matters now stand, although in some cases the men do well, there is a serious wastage of life and health against which the best-populated city in Europe could not prosper for long, and which, sooner or later, must mean certain ruin to an under-populated country like Brazil.

With the Chinese, Japanese, and *Caboclos* more comfortably and healthily settled, the Indians would then have to be tackled, and the same as ready-made homesteads are supplied by Canada to new-comers in certain districts, so should ready-cleared settlements be offered to the Indians, within their own reserves, into which, if necessary, no other settlers but the Indians or their offspring should be allowed without special permits, or if found they would be liable to punishment, even to being killed by the Indians without compensation to their relations before the law. In this way the confidence of the latter would be obtained and gradually, I imagine, the settlers would intermingle and interbreed, and the vast areas, now all forlorn and unhealthy, could gradually be developed and opened out. If within fifty or a hundred years this or a similar plan has become fairly launched, then the time will have been well spent; for, as stated at the beginning, this is not an easy or a speedy task. Someone, however, has to make the start, so why not we who are in the world to-day.

Given reasonably healthy surroundings, it is probable that the Brazilians and the Indians will breed as freely as the Chinese, who are a very prolific race, as the notices, "Girl babies must not be drowned here," bears an eloquent though pathetic testimony to in their own country. Twenty years at the present rate of depopulation that is taking place in some centres in Brazil, compared with the increased

numbers that twenty years of average comfort with a prolific race will bring, would mean just the difference between prosperity and poverty for the Republic and her people.

The Chinese as shopkeepers and traders are honest in their dealings. They are sober, not being given to use alcoholic beverages to excess; neither do they, as a rule, like the *patrões*, care to take advantage of a customer when under the influence of drink. They state a price for their goods when making a sale, and rarely care to haggle or make reductions, a habit far too strongly ingrained in the Brazilian and South American generally, and which goes a long way to handicap that free interchange of commodities which is so marked a feature in European shops that believe in small profits and quick returns. In this respect the Chinese could do as much to reform the lower-class Brazilians as shopkeepers and traders as they can do in teaching them agriculture and forestry.

CHAPTER XII.

RUBBER PREPARATION UP THE AMAZON.

NEW methods of coagulating and curing rubber with acids and chemical coagulants are not favourably looked upon in Brazil, nor, according to the latest market reports, do they enjoy their old favour over here. It is not my province to belittle Eastern methods, or express an opinion on the superiority of chemicals over smoke, but according to the latest reports it would seem that the latter is also beginning to be recognized as the better method in some of the Eastern plantations, as is shown in the report on the London (1914) Rubber Exhibition, discussed in Chapter V. Experiments have been made out East in coagulating and curing rubber with creosote and other antiseptics, and promising results are being obtained with various smoking systems. Experience shows that several of them have produced rubber very similar to smoked Pará, in that the high temperatures employed in conjunction with smoke have enabled rubber of considerable strength to be shipped containing a percentage of moisture, as in the case of fine Pará, and the proteids of the latex preserved within the product thereby adding to the weight.

That the smoked rubber from the Amazon is the best rubber obtainable cannot admit of dispute. This may be owing to the latex containing a suitable percentage of water, &c., whilst the youthful, highly tapped plantation has none, but more probably it is due to the far greater age of the

Amazon trees, coupled with the peculiar influence which the Brazilian methods exercise upon the caoutchouc globules.

Coagulating by means of acids seems bound to die out in the Orient, as opinions are freely expressed regarding their effect on the life of the manufactured product. A company has recently been formed in England to exploit the Wickham smoking machine for use on Eastern plantations, where it may prove to be of service, whilst other methods—methods mentioned elsewhere—are being closely watched by those who wish to dispense with hand labour and still maintain the quality of their product. The Wickham process, it is claimed, will produce rubber in the East of a grade almost equal to fine hard Pará (presuming that the latex so treated is equal in quality to the Brazilian), but I doubt the possibility of this unless the wood and fuel used gives off a smoke of equal density and composition to that used in the Amazon; and, of course, if the quality of the globules in the latex is not equal to those from the trees in Brazil, nothing can make them so.

The *seringuero*, in order to smoke his rubber, depends almost entirely upon the nuts of the *Urucuri* (*Attalea excelsa*), and when these are not easily obtainable uses small blocks of *Massaranduba* (*Mimusops elata*) or *Carapanáuba*, all three of which produce thick, oily smoke, of a density and composition different from that given off by any other Amazon variety of nut or timber, except, perhaps, the *inaja nuts* (see p. 246), but they are more scarce. Your rubber gatherer starts a small fire with any of these three fuels, building it in a shallow hollow scooped out of the mud floor of his hut. When the fire is well alight he heaps on more fuel, packing it in such a manner that the maximum of smoke is produced, 'on seeing which he covers the damped fire with a large truncated cone, made from tin or other convenient metal, and sometimes of earthen-

ware. A small hole, about 3 in. square, is cut in the side of the cone at its base, and this corresponds with a channel leading to the fire, so as to cause a draught. When the smoke which issues from the apex of the cone is of the required density and heat the *seringuero* causes a pole to revolve over the cone, its centre almost touching it. He pours his latex over the rapidly revolving centre, and the dense, hot smoke instantly causes it to coagulate, the creosote and other properties of the smoke effectively arresting decomposition. In this manner large balls, or *pelles*, are built up in thin layers, and if the heat and density of the smoke is equal at each successive operation the whole of the rubber in each *pelle* should be of uniform quality.

The process is a very trying one for the *seringuero*, who has to continually blow through the small hole in the base of his *boiã* to keep the heat fairly even, and also inhales the sickly, oily smoke, whilst working in a confined space close to the tremendous heat of the fire, which, in order to reduce the length of the curing operation, he makes as hot as possible. The process, under favourable circumstances, however, requires the greater part of half an hour. The smoke from the *urucuri* is more rapid in its effect than that from *Massaranduba*, while that of the *Carapanáuba* is the slowest and least suitable of the three. The finest quality rubber is that smoked by a careful *seringuero* using *urucuri* nuts; although it is said that the *maja* nut is still better; therefore it seems to me that before plantation-smoked rubber can equal the Amazon product in quality it must come from older trees and be treated with the smoke from some palm-nut containing the same chemical constituents as the *urucuri*. Every year, of course, adds to the age of the Eastern trees, so it only remains for the chemists to make synthetic *urucuri* smoke to be used on the plantations in Malaya and Ceylon.

The system of rubber smoking above explained plays havoc with the general health of the *seringuero*, and is greatly responsible for the prevalence of diseases of the eyes, throat and lungs among them, besides being the indirect cause of innumerable other maladies, and loss to their families, to the *patrão*, and to the State, as all reduces the physique of the men and even their numbers.

Among the improvements in the methods of coagulating rubber which have been favourably commented upon in the Amazon are the drum systems of Carvalho, Mendes, and others, which are also known on this side. One of the principal disadvantages of the drum system, as recommended by Admiral Carvalho, is the fact that the drum is made of metal, and thus, owing to its becoming overheated, it has to be frequently changed so as to prevent the layers of coagulated latex becoming burned. The consequent changing of drums causes a great delay in the treatment of the day's latex, and owing to the risk of alteration in the heat from the fire there is much more probability of the rubber turning out of inferior quality—say, *sernamby*. With the old-fashioned process no time is lost, the latex is coagulated at one operation and is of fairly equal quality throughout, or else the *seringuero* deliberately makes it otherwise. *Sernamby* and *entre fina* are only possible from want of proper care, or from smoking latex into which rain or water has been allowed to enter. The objection to the method of smoking rubber by means of metal drums is overcome by using a wooden cylinder in place of the metal one, and many critics are enthusiastic in predicting that the latter is bound to be almost universally adopted.

Both systems have their champions. The machines are simply constructed and are a great improvement on the revolving pole or paddle suspended from a cord and twisted by hand, and all show the tendency to adopt mechanical

smokers of one type or another. As, however, the smoky and unhealthy *boião* is used in just the same manner as formerly, the *seringuero's* health will continue to suffer until a *force majeure* steps in and forces him to discontinue its use. Whether this *force* turns out to be a more successful foreign *seringuero* or a persuasive official or *patrão* remains to be seen. There is no doubt, also, that the average *seringuero* is careless (enfeebled health is a great cause of this), and any method which necessitates a change in his habits and a great amount of attention is hardly suitable for the Amazon at the moment; but the drum systems of smoking would undoubtedly work well in the East, always presuming that the smoke used in curing had the same properties as that from *urucuri*, &c.

Travelling in Barbados in June or July, 1912, as a passenger on the Booth Steamship Company's "Christopher," I was very much interested in some samples of patent-cured rubber shown to me by Dr. Cerquiera Pinto, who had invented a method of coagulating rubber without smoke. This interesting Brazilian had analysed and studied the compositions of smoke from *urucuri* nuts and certain timbers, and had succeeded in obtaining a liquid which contains their principal components. He was on his way to New York in order to exhibit rubber produced by his method, and had a large quantity of preserved latex with him with which he intended to give demonstrations. He was very enthusiastic concerning the future of his invention, particularly emphasizing that if generally adopted the *seringuero's* health would suffer less, while a very superior product of standard quality could be produced. He very kindly made a few small samples for me, but I, unfortunately, lost them quite recently. This incident has very probably long been forgotten by the distinguished doctor, but I remained interested in his discovery, for I recognized that his ideas were superior

to other systems I had heard of or which I had tried. As, however, he exhibited his process at the London Rubber Exhibition last July, carrying off, as a result, the trophy offered by the *India-Rubber World*, of New York, for the best method of coagulating rubber latex, I am quite sure that I need say no more on his process here.

It must not be forgotten that Dr. Pinto's knowledge of rubber smoking, drying, transportation, &c., was obtained at first hand, and spread over a long period. Being a Brazilian, he consequently knows better than most critics what difficulties are to be contended with, and deserves attention when he asserts that sheet rubber treated by smoke under the drum and certain other methods could not resist the rough usage incurred in transportation and storage in distant rivers. He affirms that the proprietors and *patrões* of *seringals* cannot all send their rubber by steamer or suitably packed; that great quantities of ball rubber (*pelles*) are transported long distances by raft, and are exposed for lengthy periods to the action of sun and rain while lying in mud and water. These trying influences sometimes, but not always, result in the thin outside layer of each *pelle* becoming soft, and, as water penetrates to the under part, the *pelle* becomes loosened and ragged. When this occurs the outer *capa*, or layer, is either lost in transit or, in the classification, is considered as *sernamby*. ~~If~~ thin sheets of smoked rubber were subjected to the same conditions, it is reasonable to suppose that, though at the commencement of their journey to market they might be considered clean and of high quality, they would undoubtedly arrive at Manáos or Pará full of grit and softened, therefore dirty and probably not fit to be classed even as *sernamby*. In his arguments I believe the doctor to be right and thoroughly conscientious in his assertions. According to his experiments, he has proved to the satisfaction of himself and

many responsible authorities that rubber produced under his method successfully withstands all this rough usage and is superior to smoked rubber. Securing the *India-Rubber World's* trophy would also tend to confirm this.

If this be so, and there seems little reason to doubt it, then there can be no better method invented up to the present for treating the Amazon product without smoke, presuming that the cost of this system is not prohibitive, and in any case it shows the tendency, already referred to, of trying to produce *urucuri* smoke synthetically.

Amazon wild rubber costs nothing to collect, the utensils used by the *seringuero* are of the simplest description; they have no intricate working parts liable to get out of order, are light and therefore easily portable, and any system requiring the use of intricate implements for tapping and cooling cannot hope to enter into favour with the rubber gatherer there; and as Dr. Pinto's process does not require elaborate moulds, wringers, or presses, all these are strong points in its favour.

Methods which will produce with coagulants fine hard Pará of equal quality to the smoked product are undoubtedly necessary for the Amazon Valley, and any such which tend to standardize its rubber are bound to be finally accepted, particularly if they reduce the inconveniences and unhealthiness associated with the use of the *boião*. This very rightly maligned adjunct to the smoking process is capable of much improvement in its construction.

In its present form the *seringuero* is obliged to build the smallest possible hut around the *boião*, with the minimum of ventilation, in order to obtain the greatest possible heat, also to ensure a perfectly perpendicular volume of smoke; but an improvement is required which will ensure these necessary attributes while permitting the *seringuero* to smoke his rubber in the open. The inventor who is lucky enough

to discover a portable oven of very little weight which fulfils these conditions can be assured that his system will take precedence of any other. The oven could be based on the idea of the blast furnace, pottery kiln, and several others which suggest themselves to me; but the inventor must aim at producing the greatest possible volume of smoke and heat from a minimum of nuts or other suitable oily fuel, and, if possible, by means of glass, talc, or other substance, isolate the "smoker" whilst enabling him to watch his *pelle*. The need of coagulants to replace the nuts must not be lost sight of, otherwise the labour entailed in collecting increased quantities of fuel will become a serious obstacle to the success of Brazil and her rubber industry. Any means by which the free passage of ash would be arrested when mingled with the smoke passing up the funnel or chimney would also be a recommendation, as under the present crude system of smoking the strong up-draught carries a large amount of wood, ash and cinder with the smoke. This, striking the partly coagulated latex, becomes worked into the finished product and makes the washing at the factories a more difficult process than would be the case if the product were purer.

The drum-smoking machine with wooden cylinders and an improved *boião*, or smoking oven, would perhaps be the best method for smoking rubber, but the axle upon which the drum revolves must not be fixed, as is the case with those now on the market. The axle can be fixed at one end in order to be given its rotary movement, but the other end must be left free for the *seringuero* to manipulate exactly as he does the present pole and paddle, so that he can ensure that every part of the surface of each *capa* receives its proper share of heat and smoke. This is not possible with the drum, even presuming the cylinder to be only 12 in. in length, because the apex of the *boião* where the smoke

escapes is rarely 3 in. in diameter. The latex, in order to be thoroughly impregnated, must be passed as near to this point as possible, as it is here that the smoke is densest and has the greatest heat. The drums in use to-day being part of a fixed machine, cannot be manipulated easily enough to obtain this result, consequently they cannot by any means be considered perfect.

The *seringuero's* idea of a pole caused to revolve by twisting one end while the other is held in a loop suspended from the roof posts is not so poor as many critics may imagine. It is a very laborious process, and by leaving the *seringuero* with only one hand free to spread the latex, it is clear that this impedes him from keeping it as pure as is desirable; but surely an apparatus to turn the pole by means of the foot, as a knife-grinder turns his wheel, should not be an impossible attainment.

We have all seen, at some time or other, the old-fashioned mechanical revolving hair-brushes used by some barbers, which were fitted to an axle, this being driven by fitting a slotted wheel into a loop which was driven from another wheel on a shafting. Years ago the motive power was furnished by a small boy who turned a large wheel; to-day the same brushes are in use, but are driven by electricity, compressed air, &c. The axles of these revolving brushes are not fixed to the driving parts, and can be manipulated so that not a fraction of the scalp escapes attention. Old as this system of brushing hair may be, and though the motive power has changed, the looped belt and the detachable axle remain the same, and the old-fashioned idea holds its own. Could this not be adapted for the *seringuero's* use, to be worked by hand or foot, even outside the hut by a companion?

It is to this that *patrões* and *seringueros* must give their attention in thinking out improved methods of smoking

rubber. A treadle machine that will cause a shaft to revolve and drive the looped belt and axle, leaving the *seringuero* free to give greater attention to both fire and latex, would be of great benefit and should not be difficult to construct, or when made should be neither complicated nor liable to get out of order.

Whatever improved smoking methods are eventually introduced, they should improve the quality of "fine hard Pará" by eliminating the lower grades and so making possible a more thorough standardization of the output, thereby reducing the existing doubtful proportions of *entre fina* and *sernamby*. A large percentage of these inferior grades could, under efficient administration, easily be improved out of existence, even though the *pelles* continue to be cured by present primitive methods. It should be the endeavour of every man who has the industry at heart to ensure this improvement as quickly as possible, so that the net proceeds from the total output would be increased.

I have tried to show the advantages and defects of different methods of coagulation and smoking and the superiority which certain shapes possess for handling and packing. In forming opinions, I have been guided by all I have seen, heard, and read during a period of ten very arduous years, eight of them spent in the rubber regions of the Amazon, and while convinced of the utility of the systems of Dr. Pinto and others, I feel that very little alteration is required in the old-fashioned methods, beyond removing the *seringuero* from the effects of the smoke.

I have suggested several improvements, always basing my ideas on possible reductions in the cost of transport, living, and labour conditions in general, and they can be summarized as follows:—

(1) More attention to cleanliness and avoidance of adulterants in the latex.

(2) A system that will not necessitate the *seringuero* inhaling the poisonous smoke, yet not render necessary the abolition of the *boião*.

(3) A method which will drive the revolving pole or paddle by means of a treadle or similar simple manner.

(4) The necessity for curing rubber in such a shape that economy of space in shipping will be obtained and several other small points, perhaps of not much value, but which, in the aggregate, do much to help.

To all of these I would suggest that, even if primitive methods remain in practice for some considerable time, the making of round *pelles* of more than 14 lb. weight be avoided; that where this is not practicable, the *pelles* be cut open and the rubber classified *before* shipment to Manáos, in order that the returns from that port can be checked; also that all latex be coagulated on paddles or blades which will produce a flat *pelle* of about 10 lb. to 14 lb. weight in the shape of a bun, since these cakes could be divided into two flat halves, easy to handle and pack. All *pelles* ought to be cut open and classified when delivered by the *seringuero* and inferior work refused. If this were strictly carried out the *patrões* would find that very little *entre fina* or *sernamby* would be found in professedly "fine" rubber, much trouble and loss be avoided, and an increased demand for their product at full market price would readily ensue. Above all, the profits to go into their pockets would be larger, since the cost of production, freight, &c., is the same from fazenda to factory whether the rubber is of the best and worth 2s. 6d., or second best and worth 2s. or 2s. 3d. It is just the gain or loss of that last 3d. or 6d. which will cause the rubber industry of the Amazon to sink badly or swim along boldly and strongly in its race with the East.

CHAPTER XIII.

THE FUTURE OF RUBBER UP THE AMAZON.

UP to the year 1908 the all-in cost (c.i.f. London) of Brazilian rubber was rarely above 2s. 6d. per lb., yet to-day it costs more to produce and sells for less than it did then. The reason of this was that the all-in costs grew with the increase in selling prices, and so long as they remained high the cost of production still permitted of a fair margin for profit. When prices, however, declined with the slump and costs did not fall in proportion, trouble naturally arose, and in order to properly consider the future of the rubber industry of the Amazon one must carefully examine the cause of this anomaly.

Until quite recently, the Amazon *seringueiros* were one of the most unfortunate and ill-treated classes of labour known to civilization. They worked in the depths of the fever-stricken jungle and lived in the midst of dangers from wild animals, reptiles, and insects which in themselves made life a burden and greatly increased the risks and hence the cost of collection. The *seringueiro* knew few, if any, of the benefits of civilization, neither did he enjoy the privileges and comforts of those who live in communities for mutual protection or social fellowship. He spent his days alone in the forest depths, only occasionally visiting the *barracão* of his *patrão*, when it was possible for him to meet one or two others like himself, and knowing nothing of the world

outside, their conversation was of necessity confined to their own narrow environment. Lange gives a most interesting example of this when he tells us (pp. 290, 291) of a call he made that lasted over four hours and yet drew forth only two sentences, "*Si, senhor,*" and in reply, "*E' verdade*" (It is indeed true). After that he left, and I do not blame him.

It can readily be understood that their chief topic was almost without exception a comparison between their condition as *seringueiros* and life as they knew it in their primitive villages, where at least they were free, lived in communities, and were not condemned to silence. Like the savage, brought under the doubtful advantages of civilization, whose only theme is the vanished glory of his ancestors and his race, and who drowns all in "trade gin" and debauchery, so the poor white *seringueiro* from Ceará too often celebrated his meeting with kindred spirits by drinking bouts, which affect the men, who belong to a hot-blooded race that has given Brazil of its best, and so far too often result in quarrels and scenes of bloodshed.

Yet it was men of this type who discovered the value of rubber and made it the life-blood of the Amazon. They it was who, as *seringueiros*, tapped the trees and sold their rubber, or as *patrões* established themselves as feudal lords over their weaker countrymen and the savages, forcing them to extract rubber without any payment, or very little, finally squaring accounts, at times, with the *faca*, or a bullet.

The *patrões* were often profligates to a man, especially when their only capital consisted in their power as bullies and drivers, which enabled them to control a body of *seringueiros*. Such men easily obtained large sums of money, which they wasted, or of merchandise, which they sold at enormous profits to the enslaved labourers. In those days no one could possibly calculate the cost of production of

the rubber per lb. The *aviadores* sold their goods to the *patrões* at huge margins of profit and therefore could afford to sell their rubber almost at any price so long as their profits on goods were assured by a steady and covering return of raw rubber.

This, however, could not go on for ever; rubber ceased to come forward in quantities sufficiently large to pay off advances; *patrões* got into debt, and many were even assassinated by the oppressed workers, so that gradually hundreds of thousands of pounds were sunk in the industry in the hope of regaining early losses. *Aviadores*, in the hope of retrieving a part of the large sums so lost, began to put up the prices of their goods, with the result that the cost of living became so high that labour, transport, and in fact everything connected with rubber became almost prohibitive, and this went on until the actual breaking-point was reached. This brings us up to 1913, when the all-in cost of the rubber was estimated at about 2s. 8d. per lb., but was probably above that, whilst the sale price for all kinds was considerably below that figure. The Amazon at this time was on the borders of starvation, as the *seringueiros* were nearly devoid of imported foods, whilst they produced none themselves and could buy but little owing to the restricted credits.

Knowing this and having traced the real causes of dear transport, costly living, scarcity of labour, and heavy export duties, &c., let us consider and examine how reforms can be introduced and put into force to beneficially affect the future condition of the industry and of trade generally up the Amazon. First, taking the cost of living. It is a well-known fact that probably few regions of the world have to pay so heavily for imported foodstuffs, especially in proportion to the average possible monthly income of the bulk of the inhabitants. Yet the Amazon, until a few months

ago, was (and still is) entirely dependent for her food supply upon farinha, flour, beans, rice, dried meats and tinned foods, all of which paid costly freights and many of them suffered import duties of from 60 per cent. to 100 per cent. This state of affairs, we are told, shows every promise of being remedied, and there is good reason to hope, before long, that in the matter of food at least the *seringuero* will be entirely self-supporting. Cost of living in such cities as Pará and Manáos must also materially decrease, with better conditions in the interior. At least, so they say, but there are no signs that I can see as yet of such a reform.

Expensive Transport.—Partly owing to the cost of living, transport has always been dear. Efficient crews to work the ships have always demanded high rates of pay, and owing to the scarcity of suitable men their demands have always been met, although often out of all proportion to the value of the services rendered.

For this, the local State, as well as the Federal Governments, have been much to blame in the restrictions that they have placed upon all ships flying the Brazilian flag, particularly with regard to the composition of their crews. These disabilities, however, are likely to be abolished or reduced, and transport companies will then be enabled to employ cheaper and more efficient foreign labour, or else the Brazilian crews will have to accept lower scales of pay and be more amenable to reasonable control. As the Amazon becomes self-supporting, thereby causing a reduction in her imports, the transport and steamship companies will be able to look to the region's natural resources for freights; for instance, they will be able to generate fresh channels of trade, as in the carriage of large quantities of timber, cultivated products, &c. Producers, instead of being under the thumb of the steamship owners, should then be able to dictate their own terms by creating a healthy

competition for their custom between the companies until the freight rates have been materially reduced. The large number of privately owned river steamboats could also enter into competition with the more powerful transport companies, and it is more than likely that they would then be favoured by the authorities if the boats were owned by Brazilian houses, and by the producers if the owners laid themselves out to attend to the sale and distribution of the agriculturist's produce in the towns, and between the two, pay much better, cost for cost, than they do now. It is probable that the output of rubber, as conditions improve, could and would greatly increase if only the transport and steamship companies could be enabled to reduce their rates in order to secure a larger carrying trade as the rubber became cheaper and the quantities of foodstuffs and other produce increased.

Labour.—The existing labour supply is inadequate to cope with the present possibilities of output, even if its present high cost did not militate against its use in competition with other centres. To increase the outputs, whereby the cost of transport is to be lowered, this difficulty would become more acute, so that fresh supplies must be introduced. Men (and women), that is, must be brought in from the East, especially to plant food, who are competent agriculturists, hard working, patient, temperate, and orderly citizens. The Amazon, when her internal conditions are improved, and it is possible for these industrious people to live comfortably and safely in harmony with their neighbours, will then have the whole world to choose from, for other races, Greeks, Slavs, negroes, Latins, Italians, Spanish, and Portuguese, and even the more northern Europeans, will all find opportunities to make money, and so in helping themselves and the land of their birth, likewise help in the making of a new and powerful

nation "out West." It will be the return of those who in the beginning went to build up the modern Brazilian.

There is no reason why this, the most fertile and the richest region in the world, should find any difficulty in obtaining the necessary labour supplies that it alone needs at the moment, for given the labour, capital will come like a river flood in the rainy season. I mean, of course, such labour that, in settling down, would seek to make the region its home and would ensure the development of the rubber and other industries, and not only come like the indentured coolie, whose main idea is to grab a little cash and get back home as soon as possible. "*J'y suis, j'y reste*" must be the motto of all such comers. The effects of generations of cruelty and vice and their inseparable companion, the truck system, have left their mark on the Brazilian half-breed and Indian alike. The new-comers must cheer and wake these up generally until they forget the evil days of "debt slavery," which would soon disappear with the advent of properly chosen immigrant committees, and with the Government control of the at present untapped areas, from which rubber could be produced from the whole of those 300,000,000 trees I have spoken of, and be obtained, if run as a subsidiary industry to planting and stock-raising, at a comparatively small cost.

Export Duties.—These to-day are excessively high, amounting to 28 per cent. of the value of the product, although slight relief has been promised by the Pará authorities by a reduction of 10 per cent. of the duties at present levied and a reduction to 50 per cent. in five years is also agreed upon. But will this reduction really help the industry? Revenue, even in happy-go-lucky Brazil, is needed to carry on both the individual States and the Republic as a whole, and so, if the tax is taken off rubber, from what other source can it be raised at present? Surely we can

take it as certain that the import duties will be greatly raised, or a poll-tax or hut-tax introduced, perchance a land-tax on alienated areas suggested, and in order to encourage the planting of crops, undeveloped lands may be rated at 50 per cent. above that under cultivation or stock. Be the tax what it will, the States of Pará and of Amazonas, together with the Acre Territory, will still have to pay so many thousand *contos* per month and year into the local and central exchequers, and since rubber is practically the sole industry at the moment, it surely will not make one cent difference in the cost of living to the *seringuero* or *patrão*, and hence to the real cost of the final *pelle*, whether the whole or the bulk of the tax comes, as now, from the rubber alone, or from the house, land, or the head itself of those who collect it and send it to the ports for shipment. Little further, therefore, can be done at present. Salaries of administrators and officials are and must remain high, owing to the high cost of living, but this can be remedied, so can the mania for graft, which is so rampant and costs importers and exporters large sums of money in order to ensure the performance of services, which should be paid by the ordinary wage, and at a fair rate, on a parity with the (future) lower cost of living; whilst those birds of passage, and too often of prey, in the shape of officers who are appointed from purely political motives, and are constantly being replaced and transported long distances at the expense of the Government, must become items of history in order to avoid that most harmful of all taxes, the indirect one, from handicapping the cost of production as it does to-day. Cheaper taxation, cost of living and labour, less costly transport and better business methods throughout the rubber industry, coupled with the development of new sources of revenue, must thus be slowly and tactfully introduced, thereby allowing substantial reductions to be made

in the export duties upon the rubber exported, and when this is attained rubber will be cheapened to such an extent that it will, in the end, be better fitted to successfully compete with its rivals.

The reforms in the condition of the *seringuero*, the cheapening of labour and food supplies, by cultivation in place of their importation, will in themselves reduce charges quite 40 per cent. Reductions in cost of transport, export duties, and ocean freights should easily economize another 10 per cent., if not 20 per cent.; alter these two drawbacks and you will then find that the lot of the *seringuero* will become healthier and happier and that the Amazon would be able to turn out her rubber to pay at the all-in cost of 16d., 14d., and even less, per lb.; and this being so, she would be in an impregnable position against all comers.

With the introduction of fresh blood, bringing with it new industries, the importation of good, cheap labour, whose natural industry would improve the region, a purity campaign in business methods and the administration of the regions generally would soon follow, or trouble would arise, as those who are opposed to the introduction of the Oriental are fully aware. At present, where substantial reforms have taken place there are no means of calculating the decrease in the all-in costs to which the production of rubber will be or has been subjected, and so it is impossible to realize the advantages and hold them up as an example for others to follow.

This will be the state of affairs at that date in the future, in the very near future I hope, when East and West will, if they are wise, meet to discuss ways and means as regards costs, prices, and output, instead of fighting it out. Otherwise, if the East tried to work independently of and even in competition with the West, they would still have to reduce their output, and although at first the leading concerns

having many estates under their control would loyally abide to their agreement, possibly 50 per cent. of the output when the strain came would *nolens volens* sell out against the others, and so break down the market. Let the two centres, however, agree to work in collaboration, either taking over or financing those that are in difficulties, and, in extreme cases, even squeezing out weak-kneed undesirables; then, as already suggested, prices could be maintained at a remunerative level, but not high enough to curtail consumption, whilst the manufacturers would enjoy the blessing of an even output and of fairly level prices, with far less risk of fluctuations or an unlooked for shortage in supplies, than is the case at present.

The Amazon people, I believe, could, more easily than the East, be induced to control their output once the industry was properly organized and the *estrada* owners and the export houses realized that it was to their advantage to do so, and that the others in the ring would loyally (or by *force majeure*, in the shape of a £500 or £1,000 fine) abide by the agreement. Vigilance on outputs could always be easily maintained through the two ports of Pará and Manáos, even more so than at the many points of shipment in the East. In the present temper of the authorities and the Amazon people, any producer among them remaining out of a combine for the regulation of output, still worse, of breaking an agreement, would stand small chance of his rubber reaching market. It would most probably be seized on some pretext in Manáos or Pará, and in all likelihood be burned by an indignant populace and disgusted fellow-traders.

For these reasons the increased competition from outside cannot fail to benefit the Amazon, whatever form it may take, for if the Brazilians starve a little they will then become more docile and less unreasonable and unmanageable. If they want to be otherwise, however, let them pay the debts

that they owe to outsiders, and then they can do what they like with their rubber. As, however, there is no chance of the Republic meeting its obligations out of current revenue (and additional loans will only land them further in the mire of debt), law and order must prevail and free traffic and immigration be allowed and even encouraged.

Increased outputs from the East will keep prices low and should therefore make the West more determined than ever to save her industry. Whether she does so by neglecting her trees for a year or two in favour of agriculture and other industries, need not matter to the owner, although it would to the State. The trees would benefit by the rest, and the owners, in the end, would be the gainers. Meanwhile, however, who will pay the taxes? A suspension of tapping operations over any noticeable period in Brazil would enable the planters (in the East and West alike) to maintain prices, as discussed in Chapter V, pp. 87 *et seq.*; whilst the improvements in the food supplies and in the mode of living generally would bring, in time, increased revenues from new sources and enable the Amazon to revert to rubber tapping, rather as a second string to her bow, where and whenever she cared to do so, and thus make it rather a subsidiary industry instead of the sole one. Any such event would spell trouble to the East, so that there is every reason why the two centres should come to a common agreement as to the amount of their annual output, instead of trying to undersell each other and "running down" the rival rubbers.

Regulated outputs from the East, coupled with gradual but agreed increases in the West, will maintain prices at a level which, whilst extinguishing many estates, would pay those run on a business basis; but how many Eastern estates would survive at present remains to be seen. These consequent further decreases in output would make prices

firm at about 2s. 6d. for the best quality of the Eastern product, whilst the Amazon would obtain corresponding values for her superior product and turn out a smaller percentage of inferior grades.

The Amazon Valley rubber producers may have much trouble before them, but its awakening, though slow, is bound to be very sure and of far-reaching consequences. Though its people have committed many grave faults in the past, have been profligate, cruel and vicious to a degree but rarely attained elsewhere, there is no reason to believe them incapable of improvement in the future, and it must not be forgotten that the oppressed ones have still to be reckoned with, to be raised and improved, and then they, above all others, will be the real cause of the regeneration. Old methods, prejudice and ignorance will become things of the past, and remembering this any wide-awake Brazilian, proud of his country, must become convinced that given these reforms the future of the rubber industry is hopeful, whilst without them trouble and misery can alone be looked for.

So long as the Amazon as a producer of rubber insists on remaining in a state of imaginary security, created by the teachings of false prophets and interested wire-pullers, every Amazonian will rest contented and be difficult to reform. It was declared and believed that the *Hevea brasiliensis* could not be grown, much less made to yield a good quality latex, anywhere out of its natural habitat; and the fatal *amanha* caused them to wait from day to day for the expected failure and collapse of Eastern crops; some, in fact, I believe, are still awaiting this. To such folks it did not much matter whether rubber went high or low, was sold at a loss or a profit; trade seemed good, books showed large profits, and everyone who sold goods and could rely upon a certain return waxed prosperous, without thought of the morrow, much less of a year or two hence.

In most cases, however, all this is now altered. Traders sell real goods and insist on cash payments. Credits, instead of being allowed to drag over periods of years, are now very curtailed, and when allowed are only for very short periods and guaranteed on immediate future shipments of rubber. This is as it should be, for otherwise no industry could long stand the strain put on this one. In one year alone (1913) over £4,000,000 sterling was lost through the giving of large unproductive credits. This is no longer possible, nor, it is to be hoped, will it ever occur again.

The Amazonian has become so thoroughly habituated to borrowing on promises and undertaking to deliver rubber (and other goods, too), which he well knew he could never fulfil, in order to secure funds to provide establishments and luxuries for his many mistresses or expensive voyages to Europe at his creditors' expense, to regain health ruined by vice and disease, that the idea of a curtailment or radical change in such ways would seem as impossible to him as a McKinley tariff to an English free-trader. Even to-day a few of the old *patrões* bemoan their ill-luck and misfortune because they have now to work hard, live simply, and, being unable to obtain advances for *passeios*, must needs remain in the forests. Such men, be it said, are not many; a younger school of naturally hard-working, brilliant men have replaced them, and it is upon them and their efforts, coupled with adequate supplies of the right type of labour, that the future of the rubber industry depends.

These younger men neither ask for large credits nor (let it be noted) do they require them. The worthlessness of the old-time "facilities" has shown them the futility and the evils of the credit system. If opportunity maketh the thief, it certainly makes the spendthrift, and the way in which capitalists beg and bother tropical planters in Brazil and elsewhere to borrow money that they often do

not want, is almost criminal at times, since it is only lent to secure an estate or other property when nicely developed at an unduly low price. It is perfectly true that small credits, given judiciously to those *patrões* who are in a position to build up their businesses, are very desirable and are helpful to all concerned, but this is very different to encouraging needless expenditure, and any return to the old methods would be deplorable to man and industry alike.

To sum up, one can say that the Amazon rubber industry has passed through a crisis which if it had descended upon any other populace would have meant irretrievable ruin and a modern Exodus. There is, however, in face of it all, but little gloom, though the hard light in the eyes of some of the people shows the effects of their struggles and how determined they are to put up a good fight which will earn the admiration of all sides.

The true character of the better type of Brazilian will yet assert itself, coupled with the tendency of all Latins, since time immemorial, to shun a mediocre existence like the plague. The true South American will spend all he has in six months and then go back contentedly for six years to his estate until he has the wherewithal to do so again. Peer's or peasant's life he does not mind, but the *bourgeois* existence of a London suburb would send him into the madhouse in a month. Thus the old Portuguese spirit, which made them a famous if somewhat vainglorious nation, can again be relied upon to show itself in the doggedness and pride of the Cearense and similar types, to put up a good fight and collaborate with those in whom they have confidence to make rubber pay in Brazil.

Therefore, I say, organize the industry, lighten the burdens that weigh down the actual rubber gatherers, and improve their lot generally, and then, but not till then, will that great asset of the Amazon of to-day, viz., the quiet,

dogged pertinacity of the Cearense, Paraense, and other river-dwellers (descendants of those Tupi-Guarani races who interbred, more or less willingly, with the Portuguese, Dutch, and other settlers) assert itself and render it possible to carry out the schemes suggested in this book.

Many such men are also to be found at the head of the few business houses which are standing their ground and successfully fighting for their existence and that of the industry generally against outside competition. The assistance (in place of the opposition) of such men in any organized scheme to reorganize and regenerate the trade of the Amazon generally would be, and will be, most valuable, and once secured will go far to remove much of the doubt at present existing as to whether the fight but recently commenced between East and West will result in restoring the rubber industry; it will materially assist in the discovery and development of the, at present, presumably mythical but very real "El Dorado."

The people, particularly those with Indian blood, are patient, stoical, and phlegmatic, and it is for this reason that I believe they will fraternize with the Oriental, and especially the Chinese. Accustomed in days gone by to earn 20s. a day, and spend at times £50 before they earned it, they are equally content with 2s. a day, and do not show despondency at receiving no more; and once their cost of living is reduced to the level it could and should be, they will gladly accept 1s. a day, since the purchasing power of the lesser amount will probably equal and exceed the 2s. or more that they are now receiving.

CHAPTER XIV.

THE IDEAL SYSTEM OF COLLECTION.

It cannot for a moment be sustained that the system of rubber collection at present in vogue in the Amazon Valley is an ideal one, yet at the same time it must be admitted that no one has, so far as I know, been able to suggest a better one. By better, I mean one that will cause less harm to the tree, give less trouble to the sadly imposed-upon worker, generally reduce cost, and which, even if it does not actually increase the yield of latex, will maintain the present value of output without harming the tree or costing too much.

Many people in the Amazon region, and other parts of the globe, seem to imagine that the hevea trees of the Amazon Valley have a comparatively smooth bark, and that they are free from the little "chooks" caused from tapping with the *machadiñho*, or tapping axe, at present in general use. The block opposite, reproduced from the report by MM. Labroy and Cayla on the rubber industry of the Amazon, drawn up by order of the Brazilian Government, shows, however, that this is not always the case, although I believe that the tree shown is an exceptionally bad example of the harm that can be done to the bark of even a very old forest giant by the injudicious use of the *machadiñho* in an irresponsible *seringuero's* hands. Such a result ought to be avoided at all cost, because although the latex is still obtainable in small quantities, it is much more tedious and

troublesome, hence costly, to obtain, owing to the cork-like nature of the tree. In nearly every case which came under my notice (and they are many), a tree with such a cork-like and almost barren bark would be useless to an *estrada* owner, but might occasionally be used by the *seringuero* to obtain a little latex to repair a damaged rubber sheet or bag, or perhaps as a mark after cleaning his rifle.

On the other hand, I also include (facing p. 104) a photograph of another giant tree taken in Bolivia, showing how one of the most improved systems of tapping-knives—the Ceylon Bowman-Northway—had been used there. But this implement was too delicate for the work; the bark of this unexploited forest giant, although comparatively smooth, was still too uneven to enable the delicate cutting blade of the instrument shown to do the work properly. It is interesting to compare this tree with the one from M. Labroy's report and that facing p. 228 of the late Dr. Huber tapping a smooth-barked hevea in the gardens of the Museu Goeldi.

The editor of *Tropical Life* tells me that the Bolivian photograph was sent to him to see if he could not suggest some means whereby springs or other appliances could be added to the knife, so as to evolve an ideal instrument, or as near the ideal as it is possible to attain, for cutting a channel in the uneven surfaces of the large Amazon trees, which cannot be compared with the scientifically grown Eastern trees of from 4 to 6 years of age, so well known in Malaya, &c. In Brazil there are no such trees (in this respect) as Malaya can show, but large trees are legion, and some idea of their dimensions can be gathered from the one in M. Labroy's report, and as the tree in Bolivia (p. 104) and the others facing pp. 102, 103, and 105 distinctly show.

In view of all that is known, and much that has been written by others on the subject, what can be considered to be the ideal tool for the Brazilian *estrada* owner? What is the work it has to do, and what are the difficulties which

have to be overcome? If the *machadinho* is not perfect, which implement is better?

In the first place a tool is needed that can be used, more or less, on any diameter of tree and any thickness of bark; a cutting edge that will cut equally smooth channels through any texture of rough or smooth cortex. On this account the old Zacualpa form of knife, shown at the International Rubber Exhibition of 1908, or the "Huber knife" shown here, has appealed to some as offering a possible solution of the difficulty. The Zacualpa knife, of which, unfortunately, I have no block, had a gutter-shaped cutting edge, the shape of which could be altered to suit the shape of the groove along which the latex is meant to run. This tool had a long handle like a hatchet and was provided with a spring; it was made for tapping castilloa in Mexico, where a fairly deep channel has to be made, deeper than is necessary for hevea, yet there is the long regulating spring, which, coming into contact with the tree, could, with a little practice, enable the tapper to lean on the knife with both hands with sufficient power to force the cutting edge into the cortex just as deeply, or otherwise, as he wished, and then pull it downwards in the desired direction, at the same time avoiding going too deep into the bark owing to the strength of the spring. Such a knife can pass over uneven surfaces in almost any direction and cut deep or shallow as required, if handled with skill; and a practised hand, as with hand-cutting tobacco, soon learns when to press hard and when to go lightly, when to cut through and when to avoid the bumps. Old gaping wounds always offer a stumbling-block and must, as a rule, be avoided, but an ordinarily uneven bark can easily be tapped with a tool built upon the lines of the Zacualpa knife, if the *seringuero* can be induced to use it.

The Huber knife runs on somewhat similar lines,

especially the long-handled one. This implement was designed and used by the late Dr. Jacques Huber, who until recently (February, 1914) was Director of the well-known Brazilian "Museu Goeldi," and whose loss is regretted by everyone interested in the rubber industry. In many ways it has been shown that this knife could be used to advantage in the Amazon *seringals*, were it ever possible to persuade the general run of *estrada* owners to consent to its being so and the *seringueiros* to use them. When East meets West round the rubber trees, maybe the Westerner may then learn to use many things that he now votes impossible.

All the suggestions and advice that emanate from the wise and money-making men of the East deserve careful attention to see what can be adapted for the West, but anyone who has spent a month or two up the Amazon, and led a moderately active life, knows how difficult it is to keep in good condition even a razor which has been well steeped in vaseline, owing to the damp and heat combined. I have never been able to keep a pocket-knife from rusting, although carried in a case which rarely left my pocket, so it is hard to keep steel from deteriorating, even with the greatest care, and without subjecting it to any further influence than that of the humid heat from the body. It is only natural to suppose that tools used for the extraction of latex, many of which are still somewhat complicated, must rapidly deteriorate from the effects of climate and use combined, and it is this, to my mind, that will prevent the Eastern knives from coming into practical use on the Amazon, and that quite apart from any influence which the difference in the cortex of Amazon trees is known to exert on the implement.

If this is admitted to be the case, then it will be asked, "Which is the ideal system of rubber tapping?" and I will try to show what my own experience and intimacy with Amazon River folk have taught me.

In the first place, referring to *thickness of paring*, this is a matter which can scarcely affect the Brazilian forest trees which have already been tapped, as the surface of the bark in almost every case is rendered warty from the use of the *machadinho*; and in the second place, referring to *convenience and facility in operation*, terms that I see quoted out East, the necessity that the tool should cut in all directions does not exist in the Amazon. Freedom from possibility, or absence of clogging, is an important point, and absolutely indispensable for use up the Amazon; for apart from the extra labour involved and time lost in cleaning a clogged tool, omission to oil the same after using would render it valueless after one or two days' disuse in the *seringueiro's barraça*. This, as a rule, is nothing more than a roughly built hut, without walls, through which the damp night air or heat of the day can, of course, freely circulate, and which, in fact, seems to hold the damp. Failure to remove oil or grease before using the tool again for tapping purposes would also increase the risks of the latex becoming spoiled, while any supervision attempted to ensure the implements being used correctly or to minimize their incorrect use by the *seringueiro* would render a staff of inspectors necessary equal almost to the number of tappers.

The foregoing, however, are inconveniences which might be overcome, but I am of opinion that the question of simplicity and durability is the most important one of all to the worker and master in the Valley of the Amazon. Taking the recommendations of judges in the East under this heading, it is a fact that price, length of life, and lack of complication are of first importance, whilst retention of sharpness and facility for sharpening are of less import, as, at present, the Brazilian does not, as a rule, use either a steel or a sharp implement when tapping hevea, and cannot be induced to do so, owing to the ill-effects that he claims result from

using such tools. In that case there cannot be any better tool for him than the *machadiñho*, made with a blunt edge and from soft iron, which, owing to its bluntness, cannot harm the tree by cutting the cambium, though strong enough to make a rough laceration in the bark on the incision system. No doubt, at this point I should stop to discuss the pros and cons of incised *v.* excised cuts, with their consequent re-formation of bark, but I mean to do nothing of the sort, as I know only the one, *i.e.*, the incision method, and so does the Amazon Valley. Steel *machadiñhos* are prohibited on most rubber grounds, and are only used by unscrupulous and lazy *seringueiros*, who by making deep cuts believe that they increase the flow of latex, though well knowing that steel is popularly supposed to permanently damage the tree. Although this belief is stated by Eastern planters and other tropical agriculturists to have no basis, there is little doubt, to my mind, that the use of the sharp steel implements does damage the trees, if only by causing the cuts to go too deep. When in the Putumayo region I had many opportunities for observing the ill-effects of tapping by *machete*, where large, irregular incisions were cut in the bark by the Indian rubber gatherers, similar to the balata and sapium bleeders in the Guianas (see illustrations on p. 376), and am convinced that the use of such sharp steel instruments had more to do with killing the trees than any amount of injudicious and excessive tapping with the blunter instrument now used; at the same time, because the *machete* or a steel *machadiñho* is condemned, that does not say that all steel tapping tools must be and will be condemned for ever.

Experiments made with improved cutting and tapping tools have been, up to the present (May, 1914), absolutely devoid of satisfactory results. Two reasons for this are worth mentioning; one showing the principal difficulty in

introducing newer methods, and the latter demonstrating the effect of modern tools upon the cambium. (1) The trunks of most trees subjected to tapping by the *machadiñho* are, as a rule, too "warty" for excessive tapping, as the latex flows very slowly over the rough bark, in consequence of which it is wasted and becomes dirty; also causing the labourer employed in tapping by this system to be greatly delayed at each tree and only able to tap comparatively few trees compared with those he can tap when using the *machadiñho*. (2) The use of modern cutting or tapping tools as opposed to the old system would force every *patrão* to increase his staff of inspectors, who must be trained (and by whom?), as without competent and strict supervision the introduction of new systems in the Amazon Valley must fail. This is unattainable in any part of the vast region, and, furthermore, I am informed on very competent authority and from trustworthy sources that experiments made with gouge-tapping up to a recent date have proved very unsatisfactory. Virgin forest and plantation rubber trees which were subjected to tapping by means of steel instruments rapidly developed cambium rot, while the "herring-bone" and similar improved methods, though producing more latex per tree at the time than is the case when the *machadiñho* is used, demonstrated that the increased yield did not compensate for the distinctly inferior quality of the rubber so produced, when compared with the smaller yield but superior grade obtained by tapping with the *machadiñho*.

The Amazon *seringuero*, after making his incisions with the *machadiñho*, fixes the *tichelinha* under the newly made gash, so that it receives the latex as it drips from the wounded cells, and continues his journey until all the trees in his *estrada* are tapped. He does not take away the tin cup until he again visits the tree some hours afterwards in order to collect the latex, when he removes the tin cup and, as already stated in previous chapters, inverts it upon the

point of a convenient stick. It must be borne in mind that a small quantity of latex continues to flow after the removal of the *tichelinha*,* and this, coagulating naturally in the open, covers the new wounds and, in this way, shields them from the attacks of insects, whilst, by thus protecting the cambium from atmospheric influence, it helps to prevent rot. These shields or coverings are not, as a rule, removed from the tree until quite dry, and are the basis of *sernamby* or "scrap" as it is known to the market; and though the *seringuero* thus unwittingly protects the trees, it seems that the method is a very necessary one, which might be followed with advantage elsewhere, even if by doing so the scrap was reduced in value. Experiments with "herring bone" and other fancy tapping methods, while producing more latex, conclusively proved that the additional drain upon the rubber-producing cells of the Amazonian trees resulted in an inferior grade of the finished product, and probably the excessive tapping that prevails combined with the younger age of the trees in the East are two reasons why plantation rubber is not so satisfactory as that produced in Brazil by the forest workers. Whether this inferiority will become less marked as the trees grow older, and also are less frequently tapped when supplies overtake the demand and a restriction of output is necessary, remains to be seen.

If this is accepted as being the case, there cannot be any doubt but that the ideal rubber tapping instrument for cheapness, facility, and simplicity must continue to be a *machadinha* made from soft iron or other suitable material, which will incise the bark (one could almost say, dent or bruise the bark), without penetrating to the cambium;

* I am afraid that many technical terms used up the Amazon are spelt phonetically according to fancy. This much-used word is spelt "tishelinha," "tichelinha," "tijelinhas," "tigellinhas," to my knowledge. Which is right I cannot say. In English it is called "tapping cup."—ED.

although much could be done to lessen any damage it might cause by inducing the *seringueiros* to handle it with more discretion, or to use an instrument like the one recently put on the market, by which three cutting edges are simultaneously driven into the bark by means of a mallet. Artisans all the world over have to be instructed in the use of their particular tools, and labourers, navvies, &c., have also to learn the correct way to use a hammer, spade, &c., especially when a new shape is introduced. So, in the end, it may be best to abandon experiments with fancy tools and instruct all new *seringueiros* in the use of the original and simple *machadinho*, which under effective control can be made of immense service, yet costs little to produce, as it is practically indestructible and there are no patent rights connected with its manufacture, whilst the small quantity of metal renders it quite inexpensive to make.

The ideal system of rubber exploitation seems to me to be one based on the methods at present in vogue up the Amazon, which, though not ideal at present, have much to recommend them. Further improvements could be introduced if the tappers were taught to realize the value of a cleanly and careful method of heating the latex, and could be induced to take a greater pride and consequent interest in the methods and work generally, and also in themselves and their home. In these points I believe that coming into contact with the right class of Orientals, particularly Chinese, would help to "pull up" the Brazilian backwoodsmen very quickly. Without their help, to bring about a change would be a difficult, if not impossible, matter, and I, personally, doubt if much can be done without the introduction of a superior type of labour and administration officers, as well as by great improvements in the conditions under which the labourers at present exist and work in the rubber forests of the Amazon.

CHAPTER XV.

THE QUESTION OF TRANSPORTATION.

THE principal means of transport on the Amazon are : (1) The regular ocean-going steamship services of the Booth Steamship Company from Europe and the United States to Pará, Manáos, and Iquitos; (2) the coastal services of Brazilian companies between Manáos, Pará, and Southern Brazil; (3) the river steamer services of the Amazon Steamship Company from Manáos and Pará to all the principal rivers of Brazil, also part of Peru; (4) privately owned small steamers and launches which distribute merchandise and carry passengers on most of the lesser rivers.

The Booth Steamship Company, having a monopoly of the transportation of goods from abroad, freights run high and there appears little likelihood of their being reduced. Several attempts have been made to establish competitive lines, but all have met with failure or have amalgamated with this strong company. The coastal services are maintained by the Brazilian Lloyd Company (now reformed), the Cia. de Manegacão Freitas, the Cia. Paraense, and in a small part by the Booth Steamship Company and individuals. The inter-river services in the Amazon basin are maintained principally by the Amazon Navigation Company, which has a large fleet of rapid shallow-draught steamers, and steamers privately owned by powerful firms in Pará and Manáos, while the smaller rivers and those difficult of access must

rely upon private enterprise for transport by means of small launches, barges, canoes, &c.

The Amazon Navigation Company maintains regular services from Manáos and Pará to Porto Velho, on the River Madeira, approximately 1,718 miles; Iquitos, in Peru, 2,651 miles; Bayáo, on the River Tocantins, 105 miles; the Rivers Acre and Purus, approximately 3,000 miles; Santa Isabel, on the River Negro, 423 miles; to Montenegro, on the Oyapeck, 800 miles; and a number of services are also maintained between Pará and Mazagao, approximately 500 miles. Other services are run at irregular intervals to the River Araguaya, River Tapajoz, River Jammida, Pinheiro and Mosquero in the delta. The tonnage of the steamers owned by this company ranges from about 900 tons to launches of under 100 tons.

Apart from the steamers of the company above referred to, private enterprise is responsible for regular services as follows: Pará to River Javary and Jurua; Jurua and the islands of Marajo; the Tocantins, Madeira, Lower Amazon, Purus and Acre, the Xingu, Guana, Caquetá, and many others. Services have also been initiated in connection with the Madeira-Mamoré Railway Company on the rivers penetrating to the interior of Bolivia.

Transportation on the Amazon is extremely expensive; freight rates are high, but passenger fares are excessive, while the food and accommodation is poor. Owing to the high cost of living the crews of the steamers are paid enormously well considering the work they do. Saving could be effected in the working expenses of these boats but for the causes previously mentioned, aggravated by the local authorities, who insist that the steamers must carry officers and men who are absolutely unnecessary and in many cases are positively dangerous. But for the truck system, so prevalent everywhere, the neglect of cultivation and other

industries, and the consequent abnormal cost of food and other necessities, working expenses on the boats could be reduced to a minimum and a consequent reduction of freight rates and passenger fares would be possible. As it is, it has been calculated that transport from the *seringals* to Manáos or Pará costs, on an average, about one penny for every pound of rubber produced; not a very large sum on the face of it, yet if it were not for the systems in vogue to-day, this need cost no more than one-third of a penny; but before this can be changed a reduction of at least 30 per cent. must be made in the expenses of every branch which is a factor in the cost of the production of rubber, including the cost of food and transport on same.

A reduction equal to two-thirds of the present cost of transportation of rubber would be of great advantage, but the charge of one penny per lb. upon rubber is not a factor which seriously affects the industry, especially when prices are high; on general merchandise, however, costs are exorbitant and out of proportion to their cost at the place of production. This means that rival centres to Brazil, producing their own foodstuffs, pay far, far less for what they eat, and therefore for the cost of their rubber.

I do not consider it an exaggeration to state that the transport of food and other merchandise on the river steamers alone is responsible for an increase on their *landed* cost of from 20 per cent. in the Lower Amazon to 60 per cent., and even more, in the distant parts; what the total increase on the original price would be I shudder to think. There is no doubt, therefore, that the rates for merchandise and food are excessive; that the cargoes are roughly handled and badly stowed in the holds; that leakages owing to theft are common; while rice, beans, dried meat, and other perishable foodstuffs are liable to get wet or ruined through carelessness, and so arrive in an unpalatable condition, if

not actually unfit for human consumption. This causes a heavy loss and tends to increase the cost of living to the *seringueiro*, whilst decreasing his vitality and utility to the State. Again, so much laxity is allowed to the commanders and officers of river boats that it is a regular occurrence for a boat to lose at least five days out of a thirty-day trip to suit the convenience of these men. It may be that they will spend several hours with some parent or friend, other stops will be made for private purchases of turtles, fish, game, vegetables, &c.; and much time is lost in fishing, for their tables, and in cutting fuel. If the owners of the steamers which maintain the river services were to find means of doing away with such easy-going methods, expenses could be cut down at least 25 per cent., and much valuable time saved. It has been stated on what should be authoritative sources that the steamship owners cannot reduce freight; that practically little or no profit is made, and that it would not pay for more ships to enter into competition. But I am positive that if voyages were accelerated and some of the restrictions as to the crews, &c., removed by the authorities, a great deal would soon be done to ease the situation, besides which, with cheaper rates and an accelerated service, coupled with the advent of the immigrant, there would be more passenger and goods traffic and so a larger revenue to the owners.

The huge profits which were at one time made by the companies are also an important factor in the present-day situation of the Brazilian rubber industry. When times were remarkably prosperous a large fleet of river steamers, owned by the large supply houses, regularly sailed from Pará and Manáos for the interior; yet to-day the majority of the boats acquired during the last ten years are idle and a source of great expense to their owners. To cover losses from this cause, they must increase the selling prices of their

goods to a level which gives a fair margin of profit when selling to their *aviados*, but thereby raises the cost to the consumer in a corresponding degree.

The effect of the laying up of these steamers has also been to throw upon the streets of the cities a large body of men, who, as a class, are not only improvident but useless as labour, and who, owing to their unproductiveness, strain the resources of their families and friends, or the funds of charitable societies, whilst the men themselves contract undesirable habits and often become disinclined for steady and strenuous work again. Were such men to be employed as agriculturists they would not be so liable to become unemployed, and so would prove, on the whole, more useful to their State.

The construction of the Madeira-Mamoré Railway gave great promise of a reduction in the cost of transportation of goods and rubber to and from Bolivia and Matto Grosso; but I understand that owing to the high cost of carriage and certain other difficulties, a prominent English concern has reinstituted the old system of transportation by canoe from the Falls of Santo Antonio to Bolivia, a matter much to be regretted owing to the large toll of boatmen which this dangerous voyage has already claimed, and which will probably soon conclude with the extinction of the Indians employed as *peons* in this region.

Another matter which I think merits the attention of the private shipowners of Manáos, Pará, &c., is the advisability of discovering some manner of using the boats now laid up, and a return obtained which would certainly lessen the cost of their maintenance and perhaps even provide some margin of profit, and at the same time arrest that rapid deterioration which is inseparable from disuse in a climate such as that of the Amazon.

To do this I would suggest that a co-operative or similar

organization be formed to "pool" these ships and place them under the control of a single governing body, preferably European, running them in opposition to the existing powerful companies, which have a monopoly of the cargo-carrying trade. If this were done, fuel could be imported in much larger quantities and so very materially reduce its present cost; *the officers and crews who are at present unoccupied would be obliged to accept a standard wage instead of one that has hitherto depended upon the caprice of the authorities*; while administrative expenses and charges upon capital, which are at present unnecessarily heavy owing to the competition of a large number of houses, would, owing to this centralization, be greatly reduced. Freight rates could be very materially lowered, and goods which are a glut upon the markets of Pará and Manáos could be carried on a consignment basis and sold at sight in exchange for rubber or other products of industry along the Upper Reaches. A regular trade could be created in the natural products of the forests and rivers, or in cultivated foodstuffs for the smaller towns. Industries in connection with timber extraction, spices, resins, and vegetable oils, could be given a chance to develop and at least tried until such time as a normal state of affairs is the rule. Instructions would have to be given for cargo of every description to be accepted or even canvassed for, and private enterprise in new industries encouraged.

Transportation in the small rivers and creeks is at present almost wholly carried on by the masters of the larger *seringals*, who have acquired small launches or motor-boats. These they run under licences which are granted by the authorities in Manáos and Pará, and are not under such strict regulations as are those which regularly trade from these ports. Their owners, as a rule, obtain a boatswain's certificate (which can be purchased or obtained by graft),

and only one engineer is carried—generally a man with a very inferior certificate, and in some cases a mere engine-driver. They run about the small rivers on business of their owners, carrying goods for distribution and collecting rubber from the *seringueiros*. Where these launches cannot penetrate, transport of goods up-river is dependent upon large canoes, &c., and rubber is brought down river by means of rafts.

Transport under favourable conditions to the Acre district of goods of first necessity is responsible for an increase of not less than 50 per cent. over their invoice price in Manáos, and the same applies to goods shipped to the Juruá, Tarancá, Môa, &c. The increase on invoices shipped to the more distant rivers runs in many cases to quite 100 per cent., and I submit this figure as without exaggeration. Even goods shipped from Pará to places situated within a radius of 400 miles demonstrate that freight charges are not less than 20 per cent. over the invoice value of the goods, which is already too high.

The remedy for these heavy charges is full of complexities; the truck system must be first abolished; voyages must be accelerated; a great deal of attention must be paid to the cultivation of foodstuffs; steamship companies must foster timber extraction, fishing, brickmaking, farming, cattle or goat rearing, and a host of other industries must be created by the granting of increased facilities to industrials for the carrying of their products to the markets.

Most steamers complete their return journeys with little freight, beyond small lots of rubber, so that if only small charges were made for transporting products from the interior, a trade would quickly grow up in the plantation crops, forest products, &c., which would rapidly compensate the companies for any enterprise and assistance they may show. At present the companies which have control of the

means of transport in the Amazon Valley are absolutely devoid of enterprise. There is not one single steamer on the rivers to-day which could handle a shipment of timber for cabinet-making, while cargoes of pebble, shale, gravel, stone, sand, or timber for building purposes are out of the question, even if an equitable freight were charged for their transport. Cases for packing rubber are imported at great cost, and this to a region whose forests contain valuable woods, which, partly owing to transport difficulties, seem likely to remain there.

Ice for cooling drinks is obtainable on most boats running from Manáos and Pará, yet not one has facilities for carrying fresh meat, fish, or game in quantity from the interior. Fishing for the markets of Pará and Manáos is entirely in the hands of a few Portuguese, who are towed to their fishing grounds up-river. They fish by means of nets, but more generally by dynamite, storing their catches in ice-boxes. The boats are allowed to float down river on the current without any effort on the part of these men, who generally take advantage of this to sleep. The fish thus brought to market with the minimum of effort must arrive in varying degrees of freshness, but in spite of this it brings whatever price is asked. Were it not, however, for the want of facilities in transport, large quantities of really fresh meat and fish could be quickly delivered to consumers from rivers within a radius of fifty miles, and the fishing industry rapidly developed to the advantage of fishermen and consumers alike.

Again, apart from interior transport, when the formation of a wood-pulp enterprise close to Pará was mooted some few months ago, it was ascertained that the freight charges from Pará to Liverpool alone would amount to more per ton than the value of the product in England; yet wood-pulp is brought from the great forests of the European and North

American Continent, and is a profitable industry which justifies the construction of special ships; while the services of trans-oceanic steamers to the Amazon have recently been greatly curtailed for want of cargo. If an industry in wood-pulp was started, no doubt a paying market would soon be found, and later, as the output increased, Brazil could compete with any producing centre, with the advantage that whilst elsewhere the timber tends to become dearer and scarcer, her supplies, which have only recently been attacked, would last for a long time and not tend to cost more.

Transport up the Amazon interior is admittedly dear, owing to the high cost of living, yet why a new industry (which might have a great bearing on the present and future economic condition of the river) should be impossible of inception, seems to me a matter which the steamship companies could and should remedy, and if not they, I am quite sure outside capitalists could, once they have confidence in the locality.

On almost every hand one hears wailing and complaint at the taxes which rubber has to support, which amount, along with dock and harbour dues, to about fivepence per lb.; but the question of these charges is dealt with elsewhere. Transport from the interior costs from a penny to fivepence per lb., according to distance, and ocean freight from Pará to the United States at 60s. and 65s. per ton of 40 cubic ft. amounts to about a penny per lb. With rubber at 5s. per lb., this would be an insignificant burden upon the product, but with the article at 2s. per lb. all round it is a serious item, and if rubber becomes much cheaper it will be prohibitive, as it means just that increased cost which will knock the Brazilian product out of the market in competition with the East, whilst the present rates up-river, when paid upon light imported foodstuffs, such as potatoes, onions, rice, flour, salt, and other like commodities, is a very serious

matter. The Brazilian never has had the desire to estimate the cost of producing his rubber by the pound, nor of calculating his profit (?) on the high price which he has had to pay for necessities; but if he were enlightened as to the part which high freights play in the cost of living, he would perhaps be awakened to the necessity of cultivating rice, beans, &c., and, in fact, of making the most of one of the most prolific soils of the universe to supply him with food. To awake him, however, you must place others around him who will produce their supplies whilst tapping rubber, sending both to market to sell against him and thus grow rich on the profits whilst the Brazilian becomes poorer and poorer. Then, and not until then, will the *caboclo* be awakened, never to sleep again. Maybe this is why the foreigner is kept out.

It is useless, perhaps, to expect any amelioration in the high rates charged for carrying merchandise into the country, but great reductions, as has been suggested, can be effected in the cost of river transport. For this the *patrões* must not look for outside assistance until they abolish the truck system. This done, means could then be found to establish new industries, and the steamship companies must, in order to obtain full cargoes, instil this into the minds of all concerned, and so foster enterprise for the good of all.

Freights would then very materially increase in volume, and it would not only be practicable but profitable to revise existing tariffs and bring them down to a scale which at present is not even dreamt of. When enterprise on the part of navigation companies is thus apparent and real, a revision and reduction of the taxes upon rubber would become automatic, especially as by that time new industries would have arisen to share the burden.

If Brazilians really mean to serve their country well, they must tackle this transport problem with a will, and, as suggested, "pool" their ships and place them under the

control of a central administration. They must also assist in the break-up of the truck system; establish new industries and assist the workers; fight existing monopolies; and if needs be, abandon rubber as a leading industry for a period in favour of other natural resources which can make the Amazon region self-supporting. Here is glory and honour enough to satisfy any body of patriots. Brazil has such men and they are to be met with up the Amazon as elsewhere—practical men unaffected by politics or graft—who can, with little effort, obtain control of the privately owned steamers and work them to general advantage. If such men can only succeed in coming together they would quickly be in a position to counteract the machinations of the ring of financiers and transport companies which at present have control, and whose heavy charges are helping the East to squeeze out the Amazon as a producing centre for rubber.

CHAPTER XVI.

AMAZONIAN INDUSTRIES.

PAST NEGLECT AND FUTURE POSSIBILITIES.

[No one will deny that rubber, and rubber only, keeps the Amazon going, and, as the tide is drifting to-day, should her rubber get submerged in the floods of competition, that the Amazon must go down with it. There is time, however, to still show how the Brazilian rubber industry can yet be kept afloat, and by doing so cause the three States dependent on this product* to become in time even more permanently flourishing than they were in 1907-1909, when the effects of the rubber boom raised them to an unexpected height of prosperity. When they reach that level again, however, it is to be hoped that they will remain there, and instead of wasting their money in paying five and ten times the value of all they buy, that they will expend it in extending the up-river trade and in helping to open up the lands there, inch by inch and mile by mile, to the agriculturist, stock-raiser, and lumber-man, and so remain wealthy for all time as Argentina has done further south.

Algot Lange deals so fully with the timbers of Brazil,

* Manáos, Amazonas, and the Acre Territory, to say nothing of Ceará, Matto-Grosso, and Rio Grande do Norte, which, of course, also produce rubber, and so will do well to master the contents of this book, and improve upon the crude suggestions it contains, in the same way as I hope Northern Brazil will do.

of which a fine collection, including over two hundred varieties, were shown at the recent (1914) Rubber and Tropical Exhibition, held at the Agricultural Hall last July, that I need not go into such details as I would otherwise feel compelled to have done.

According to Lange, the soil and climate of the Lower Amazon are admirably suited for bananas, and vast regions are there available for planting with an easily accessible market at hand for the crop. The *castanha* or Brazil nut industry is capable of enormous expansion; only one-tenth of the actual yield at present being gathered. The extraction of *andiroba* (or crab-wood) oil would fully warrant the installation of a plant in Pará. Oil and stearine is also contained in the *ucu-uba* nuts, little known at present, and each tree will yield about two barrels of nuts a week during the season of maturity. The vegetable ivory nut (*jarina* or *tagua*) grows in great quantities on the middle and upper reaches of the southern affluents of the river, and the "false ivory nut" from the mirity palm grows in enormous quantities all around Pará.

Cacao, which at present grows wild in many parts of the Valley, is also cultivated, and in spite of the great carelessness bestowed on this valuable crop, the bean of the Lower Amazon has a very good flavour. With tobacco, the Bragança and Acará varieties are of high grade. The soil seems particularly suited for the raising of a large, full leaf. Cattle-raising can never succeed until a suitable grass is planted. This is what I also recommend, but to do this the present grass must be burnt off and the land broken up; even then the top-spit should be fired, if possible, to kill the roots, otherwise these strong, rank grasses will never be eradicated.

Thus speaks Mr. Lange, confirming all that Mr. Woodroffe found and has reported on after his seven or eight years'

experience; but it is Lange's chapter on timbers that I would advise the readers of this book to study.* His righteous horror at seeing hundreds of cords of mahogany and rosewood being stoked into the bunkers of the river steamers as fuel, and the general lack of appreciation of the cedar, greenheart, and "a certain wood rivalling Circassian walnut," bear eloquent testimony of what the Amazon forests can yield (intersected, be it remembered, by the most wonderful network of waterways down which to float the timber), and what is at present being done with these valuable woods. A list of ninety trees is given with their local names, and the book concludes with sixty-six of these with the scientific names as well as the popular ones.

I would like to say, however, that besides the trade in *castanha* or Brazil nuts, which could be considerably increased, and the demand stimulated so as not to lower prices, the cultivation of tobacco could, I am certain, be carried on with great advantage to the planter and the (future) factories in town, provided, of course, the right soil was first chosen, and then prepared and cultivated into a condition suitable for the production of high-grade tobaccos under shade, as is done elsewhere. Besides Brazil nuts, the forest products to-day could and should include substantial quantities of vegetable oils from the cumuru, puxury, piassava, and other oil-yielding palms; whilst, for lumbering, the sleepers supplied from the forest trees for the Madeira-Mamoré Railway make one realize what the Amazon Valley could do once her forests were opened up and a trade developed in her timbers.

All the observant travellers speak of cacao trees (*Theobroma cacao*) being met with in the gardens here and there.

* Say chapter xxiii, on Amazonian Timbers, in "The Lower Amazon." G. P. Putnam's Sons, London and New York.

This is a crop that can be very beneficial to the household, nourishing, grateful, and comforting, that anyone can grow, cure, and prepare for the table, and later, as the crop increases, can sell or exchange it for other commodities, whilst its cost, beyond the land necessary, is *nil*. Planted 12 by 12 ft., or about 300 to the acre, or better still, 15 by 12 ft. or 15 by 15 ft., catch crops can be grown between the trees at first so that but little room is wasted before the crop is ready. Coco-nuts are also spoken of in many parts; here also is a useful, pleasant foodstuff for the *seringuero*, with unlimited possibilities of trade if the supplies increase. With a homestead of chicken, ducks, a cow or two, and some cacao and coco-nuts around, plus the *estrada* to exploit for its rubber, what a much healthier, happier, and altogether more useful life to the State and to the world at large could the *seringuero* and his family lead than they do at present, deposited in the midst of wild bush, and beset with damp lands, miasmas, and pests on all sides.

The London Rubber Exhibition, already referred to, called everyone's attention to "the splendid Amazonian hard woods and timbers, growing in great abundance throughout the forest regions of the Valley, and which are now gradually winning commercial favour in the consuming countries on account of their many valuable qualities and modern adaptations. English wood buyers, especially for furniture, buildings, railway engineering, and structural work generally, should study these woods and secure full particulars about them."

Of fibres, I remember the piassava, whose fibre for brushes, brooms, &c., needs no introduction to the commercial man; then there is the basu or uavassu (*Manicaria succifera*), which also yields a capital fibre for the same purpose; and a third is obtainable from the tucuman tree (*Astrocartium tucuna*), the fibre of which made into hammocks

and yarn or string is said to command a good price. The *inayá* or *inajá* tree (*Maximiliana regia*), whose nuts are preferred even to the *urucuri* nuts, gives a very thin but strong fibre, used for making baskets. Of medicinal plants there are quassia, guarana (which comes from a low bush that at first sight reminded me of coffee), the marapuama, said to be better than kola; sarsaparilla, manacá or vegetable mercury; assacu, used by veterinary surgeons; ipecacuanha, jaborandi leaves, &c. Angico and copal gums are also there, tonca beans, balsam, resins.

The lack of up-river sawmills is a drawback that should at once be remedied, as they are easy to run, with water power, either direct, or through a dynamo.] At present it is only a comparatively few men, mainly Portuguese, who make a fairly good living by ascending the rivers at various periods in order to obtain timber for constructional work in Manáos and Pará. The only tools which they use are the axe, adze, and machete, while the party may carry blocks, pulleys, and ropes to ease the heavy trunks over obstructions; but most of the timber is transferred to the water's edge, to which it still has to be helped, and made into rafts purely by manual labour. Needless to say, therefore, that none but men of the greatest strength of muscle and constitution can take up this terrible labour; they must be experienced lumber-men and practised in the management of huge rafts. I have come across small parties of six or seven men, who in four months had cut down hundreds of logs for scaffolding, &c., and have watched them until their raft was complete, and then travelled short distances with them, marvelling as I did so at their skill and strength, even where their efforts seemed so puny compared with the huge mass of floating timbers they controlled. That these men will go through so much in order to obtain timber is an eloquent proof, if any were needed, of the

huge profits which can be made if the useful and valuable trees up-river were systematically exploited.

Perhaps the industry which at present is most worthy of attention is the establishment of lumber camps and saw-mills. Cases for packing rubber and sleepers for railway lines are imported at great expense, although to convert local Brazilian woods to these purposes there is plenty of power available, as at present the whole of the Amazon is running to waste. Not only is there an illimitable lumber trade awaiting development, but there are also grasses, shrubs, and trees suitable for pulp and paper-making, whilst the extraction of their saps, oils, and resins as by-products offers the means of making further profits; sawmills and paper-mills, with the river as their "fuel" and "railway," should do well in all directions.

Specifying only a few of the better-known trees for the lumber, structural, and other trades, a rough description of them will perhaps be of value. Cedar is found almost everywhere; massaranduba (*Mimusops elata*) is a magnificent red wood of close grain. It grows to a height of 80 ft. and 10 ft. in circumference. Its specific weight is 1.172 and resistance 1,070 kilos per cubic centimetre. The bark is rich in tannin, its latex is good as a substitute for milk, and also produces a variety of gutta-percha. The small branches cut into small blocks would find a ready sale for smoking rubber, and perhaps could be exported to the East.

Macacaúba grows to a height of 30 ft., circumference 3 ft., and is also a red wood; varnished or polished it is remarkably like mahogany and is of inestimable value for the higher branches of the woodworker's art.

Tartaruga (*Brosimum discolor*) is a chocolate-coloured timber, deeply marked with black patches which render it very similar to tortoiseshell. It is one of the prettiest

of Brazil's hard woods, and would be greatly appreciated for the interior of churches, palaces, &c. At present it is only used for making walking-sticks, for which high prices are paid all over Brazil. Muirapiranga (*Mimusops balata*) is another remarkable red wood, very heavy and of close grain. It grows to a height of 60 ft., with a circumference of 6 ft., and though of value, the latex (*balata*) is not extracted. Its wood is valuable for sleepers, stringers, &c., for bridge building, and many thousands of trees were cut down and used in the construction of the Madeira-Mamoré and other railways, but the source of supply is practically inexhaustible, the tree, it is even said, being more abundant than hevea.

Páo Ferro (*Apuleia ferrea*) is another magnificent red wood which has been used as sleepers and in railway construction. It resists damp and makes excellent piles for bridge building, &c. As its name implies, it is almost as hard as iron, and it would be of great value for building purposes. The bark has medicinal properties and should also be saleable. Itanba preta (*Oreodaphne hookeriana*) is also another excellent timber useful in bridge building and railway construction; it makes good sleepers, and does not easily rot when buried or if placed under water. It would also be of value in cabinet-making as it would last longer than oak, which it much resembles.

Other woods useful for cabinet-making and articles *de luxe*, on account of the beauty of their grain, are páo rosa (*Physacalymona floridum*), a pretty yellow wood with parallel rose-coloured markings; bacuri (*Platonia insignis*), a very dull-grey palm wood; páo precioso (*Mespilodaphne preciosa*), another yellow wood with pretty varicoloured veins, the seeds, bark, and wood of which make an excellent perfume; páo roxo (*Peltogyne venosa*), a very pretty variety of rosewood; copiuba (*Capafeira sp.*), a very handsome red

wood; acapu (*Andira aublette*), found in a variety of colours, is of great resisting power, impervious to white ants, and lasts for centuries. All these and a multitude of others are only waiting for the practised eye and muscle of the lumberman to give up their hidden beauties and values for the benefit of the Amazon and its people, and of the nations trading with Brazil.

Wood-pulp and paper-making as an industry would be a very profitable undertaking on the Amazon; not only are the forests filled with trees, grasses, shrubs, &c., rich in cellulose, but the very banks and islands in the rivers are covered with large quantities of wild cane and coarse grasses which are worthy of industrial attention, and the removal of which would, for several reasons, be an enormous benefit, whilst with increased cultivation, large quantities of plantain leaves, maize, straw, sugar-cane, cotton, and other waste, &c., would be available to ease the world-hunger for raw material for paper-making. Suitable grasses, fibres, &c., could also be grown for replacing supplies at first obtained from the trees cut down, or grasses removed for ploughings, and planting crops of ground-nuts, soya-beans, maize, sugar, cotton, and other produce; the rent of the now cleared areas or the direct profits to the saw and pulp mills from the sale of these crops would reduce working and administration expenses, and all help to increase the population and purchasing power of the Amazon, and hence the demand for manufactured goods from here.

The absence of the rice field is to-day a serious loss to the rubber industry, especially as Brazil, and more particularly the Amazon, could, in the course of a few years, establish itself on the markets of the world as a producer of rice (as it could of soya-beans and maize), and perhaps in the end she would not occupy the second place either as regards the quality or quantity of her output.

All these are real and apparent riches to be obtained by man from the surface of the earth, and who can tell what remains buried beneath? It is only by profitable deforestation outside the rubber belt, or where open spaces abound, that the Amazon Valley can be obliged to give up part of its colossal wealth, and so enable the discovery of the real El Dorado to become an accomplished fact.

Then there are the fruits, chief among which may be cited abieiro (*Lucenna cannito*), a magnificent yellow fruit of splendid taste and aroma; Pará apricot, a fine tasty fruit, about the size of a large orange; guava or goiabera, a splendid fruit for preserving, and though well known the world over and exceedingly common in the Amazon Valley, the trade in its jelly, &c., is not developed as it should be, so that large quantities of goiabada, a sweet-meat made from the fruit and manufactured in Southern Brazil, have to be imported every year, truly forming a case of where "coals have to be brought to Newcastle"; bacuri (*Platonia insignis*), very sweet and aromatic; anonaceas, of many varieties, all excellent pulpy fruits; acayu (cashew), well known in the West Indies and in parts of Brazil, used for its nuts and also for making a kind of wine; these and many others, all offering immense possibilities for export, either as fresh fruits or preserved, abound on all sides and their quantity could be increased as jam and canning factories become established.

The rivers teem with fish, yet the fishing industry is neglected. Probably no body of fresh water in the world offers such possibilities for fishing and canning, if proper advantage be taken of the by-products, and oil and fertilizers are made from the waste or the inedible kinds. There are huge returns awaiting the first factory for the proper extraction of fish glue, fish oils, isinglass, oils, fertilizers, &c., not to mention patent animal foods. With such splendid

material as pirarucu, matrinchão, curimatá, tucanaré, catfish of all varieties and sizes up to 6 ft., tambaqui, pirapitinga, peixe boi (*Manatus*), turtles, &c., it seems remarkable that no effort has been made to organize a fresh fish or a fishing and canning industry. The Brazilian authorities would most certainly grant every facility to approved concerns to do so, and though it is obligatory that every boat flying the Brazilian flag shall be officered by Brazilians, and that Brazilian sailors must form at least two-thirds of the crew, I am sure that little difficulty would be raised to the employment of alien fishermen, at least for a number of years, if it is found that the success of the industry depends on the new-comers manning the boats. There is no reason why the Amazon Valley should not be as well known as the Alaskan and North American rivers for canned fish, or as California for its canned fruits.

Shellfish are abundant in many rivers and deserve to be better known and utilized, not only for their value as food, but for the beauty of their shells. Many of these fresh water molluscs contain pearls of beauty and value, and a trade in this way could be developed for a certain number of people.

Agriculture, sericulture, viticulture, fisheries, lumbering, &c., with their allied industries, are therefore at present neglected, yet the Amazon is probably one of the most favoured regions in the world for their establishment, and it only wants a modification of the present useless and harmful laws to be made, for thousands of experienced and industrious immigrants skilled in these industries to come to Brazil. Once started up the Amazon, they will help to ease the burden on rubber, thereby lowering the cost and so enable Brazil to successfully compete against plantation rubber in the East. Without the immigrant Brazil can do nothing, and never will do anything, except go back-

wards, but with a steady flow of the right type of immigrants she will not only hold her own against her rivals, but outstrip them.

[All will agree—conservative Brazilian, up-country *caboclo* or pushing European—that nothing can affect—for good or for ill—the future of the rubber industry up the Amazon so much as an increased output of foodstuffs or, as at present, the absence of any reliable sources of supply. Until these supplies are forthcoming, until, I would even go so far as to say, the Amazon Valley produces sufficient foodstuffs to feed her own folks, and that, too, when their numbers are far larger than is the case to-day, and even have enough to send to Ceará and other less fertile areas, I have grave doubts as to whether, unless the unexpected happens, she will be able to compete successfully against the best-managed estates in the East.

I feel this because, as discussed elsewhere, the collection and preparation of the rubber latex for market should be and must be made a secondary industry, rather than the chief one, at any rate, so far as dependence for one's food and housing is concerned. I make this suggestion so that if luck generally goes against the *seringuero* he should be in a position to hibernate, so far as rubber is concerned, and hiding himself away, like a dormouse or a hive of bees, rest through the period of lean months, living on his cassava (mandioca), maize, bean, or other patches, and also have a sufficiency over to send elsewhere, as he now does with the rubber (whether it pays or not), in order to receive the cash or trade goods, *i.e.*, clothing, gunpowder, agricultural implements, &c., which he needs, in exchange. We are always talking of catch crops between the trees, before the maturity of the main crops on large estates; surely in the same way catch crops could often be taken off large areas, even when they are subject to annual inundations, between the

floods, as well as other crops of a more permanent nature on the higher lands, which, though containing at present, during, or following on the rainy season, a surplus water supply, are never actually under water. When the Government of Brazil starts to open up the forests generally, in order to attain access to those 300,000,000 rubber trees at present untapped, I would maintain that they could well go to work on lines based on the following, and that in doing so they would almost immediately render the entire area healthier in every way and would, in course of time, by the addition of decayed vegetation and steady cultivation, coupled with an adequate network of canals or wide ditches as we have in British Guiana, tend to raise and solidify areas that at present seem entirely useless and so render them available for permanent crops the same as the areas in the upper lands. Working backwards from the river's edge, therefore, we should have, perhaps, four belts to be considered. (1) The always impossible areas, except perhaps for cattle grazing, because of the too lengthy periods of flooding to which they are subjected. Even these, however, could now and again be burnt off, and roughly broken up, perhaps planted with an improved feed for the stock, and at the same time canalised, so as to hasten the draining off of the moisture. (2) The area at present liable to inundations, but which, in course of time (except, perhaps, during an occasionally extra high flood), could be made higher, and which by draining and cultivation would become more solid and so be available to live on (the houses being raised, as now, on piles), and for more or less permanent cultivation of all sorts. Furthermore, when the waters from the hinterland and higher lands are diverted nearer to their source, both the foregoing areas would receive a much smaller quantity than they do now, when they get all their own and, apparently, much more from the upper lands as well. (3) The raised area that is

never liable to inundation; this and the area (4) which goes back into the forests, or intersects them, will become increased as the settlers, backed up by the Government's direct or indirect aid, will slowly but surely drive back and exterminate the useless wild growth, and with that the myriads of snakes and insects that are now a pest and a danger to every one. This clearance will take years to complete maybe, but once the population is there it can go on at an amazing rate, for as soon as a few acres of the land are opened out the newcomer can immediately put down a crop to mature and ripen, and start collecting rubber to help make two ends meet; whilst all the time the men of the entire community, who wish to undertake the work, will be paid to clear, clean and burn off the growth whilst draining the tangle of swamps and jungle. As soon as this is done and the area ready for cultivation, it can then be passed on as cleared land to the Government, who would pay the settler an agreed sum (whether the same man continues in occupation or goes elsewhere) for such work, recovering the amount in annual instalments from the occupier of the land who then enters into possession of it.

The use of explosives is likely to facilitate operations, whilst reducing the cost and labour of such work up the Amazon as it has done elsewhere, especially to (1) break up waterlogged areas and by loosening the earth to ease ditching and draining operations at the start, as well as ploughing and the more intensive cultivation later on; (2) to throw or lower into the creeks or *ygãpos*, &c., infested with snakes, and then, by exploding them, to kill many at one time, and at a safe distance; (3) to remove trees and bushes without excessive axing, and at the same time aerate the soil and clear the air of noxious vapours; the explosions would also, probably, kill off or frighten and drive away snakes, animals and pests that are at present troublesome, if not actually dangerous, and which would be far more so

were fencing and gardens to be established for these undesirables to break through and despoil, as they quickly learn to do.

Whilst man is thus slowly driving back "the wild," he will take precautions not to be driven back himself in his turn by the jungle again. Once a rough clearance is made, the horrible creeks can be dredged and cleaned, and the snakes, &c., exterminated and dispersed. During the drier seasons a rough burn off, that is too mild to harm the rubber or other valuable trees, will send these pests scuttling further inland, and the opening-up of the country will prevent their return in the hordes with which they now seem to infest the forests and pampas and make life loathsome and miserable to the new-comer.

Surely, to do this is not beyond the strength of man, even of those more primitive races who, in the course of time, have terraced the mountains of their homes and produced those thousands of acres of rice fields that are the marvel of everyone who has seen them, if only in pictures. It is in a manner similar to this work that I feel Brazil can, with the help of the rice and maize growers of the East, win the land from the jungle; and whilst the Government, directly or indirectly, finances and so introduces the steam plough, ditcher, and dredger to use where possible to break up, clean, and clear the land, haul timber and loads, &c., the patient, plodding individuals, like crows following a harrow in India, will complete the work by banking up the weak places, sowing the seed, &c., until in the end the West will rival the East, both as a producer of rice, maize, beans, sugar-cane, &c., and also as an exporter of rubber extracted by the cultivators from the trees that stand in the *estradas* near their homesteads. This, surely, is no fancy picture. If we can get a quarter million souls, men, women, and children, or even 100,000 established on the healthier and more useful area, reclaimed by the co-operative collaboration

of all concerned, Government and governed alike, surely it will pay Brazil or those financing her to do what the Canadian Government is doing for settlers in the Dominions, and what Sir William Lever suggested,* should be done in the Tropics, viz., to give to settlers broken and cleared land, with or without a house, to settle on and to be paid for by instalments on terms to suit the settler. "I see no reason myself," he wrote in the Foreword to the Coco-nut book, "why the various governments affected should not give financial encouragement to enable them to establish estates (he was speaking of coco-nut estates) by helping them over the period which elapses before the plantation comes into bearing. If this were done, it would open up tropical possessions in a way that we can scarcely realize. It would increase the ties with European countries, and find good, wholesome food for the teeming millions. It would increase the purchasing power of tropical countries, and would open up profitable opportunities of employment for young men who wish to go there.

"I would call attention," he continues, "to the enormous impetus that has been given to the development of Canada by the very simple help the railway companies and land-owners† have given to emigrants in the way of starting them with a homestead into which to move on arrival on the prairies. This simply means that by making it possible for families to move into Canada, that country has become prosperous and successful.‡ The money is paid back by the emigrants, and I believe that no loss has resulted under

* In his foreword to "Coco-nuts, the Consols of the East" (1st Edition), by H. Hamel Smith and F. A. G. Pape.

† In Brazil this help must come from the Government, or the big International Syndicate already spoken of.

‡ Do the same to the Amazon, and Brazil will respond in a similar manner.

this system. If planters were similarly encouraged in the Tropics by the help of a little capital* and a bungalow, the security being on the plantation, a rate of interest could be arranged sufficient to cover all risks of loss, and to give the Government granting the loan a high return. It is not possible for any private individual to work on these lines, but it is possible for Governments. There are millions of acres of waste land in tropical countries waiting to be developed, and all that is wanted is a little help from the authorities to convert waste tropical possessions into veritable gold mines, producing wealth beyond the dreams of avarice, in occupation as well as in money, and in addition providing food for all.

“As a proof of this, let us consider what the Government railways have done in developing Nigeria. Surely, with this striking object-lesson in front of them, other governments could assist in some other way to further develop coco-nut planting and allied tropical industries, so as to ensure that we make the most of this enormous field for human activity.”

Thus wrote Sir W. H. Lever, head of Messrs. Lever Bros., Ltd., in May, 1912, and Sir William is no dreamer. To-day the demand for foodstuffs is more persistent than ever; the situation will get worse as the war continues, and for some time after, and the East, probably, will suffer the most, since the labourer's margin of profit there, already so invisibly fine, will disappear as the European demand exhausts the surplus food supplies without buying other products as well, thereby forcing the Eastern producer, when things are bad with him, either to pay more for the food he himself helps to raise round his own door, or to go without and starve. In India they starve already, or would do so without the help of the authorities and the charitable. Thus it

* Or its equivalent in cleared land with or without a homestead, &c

is as necessary for China, Japan, and the neighbouring countries around them to help move a proportion of their people to a country like Brazil, where, with their Eastern habits of thrift and steady work, they can, in time, not only secure the food necessary to keep their own lives going, but produce a surplus to feed Brazil, and to export elsewhere, and thus help to increase the food supplies and purchasing power of the world generally and with that to remove the burdens now crushing the life out of the Amazon rubber industry, and enable it to compete on equal terms with that same East from which these future saviours of Brazil are to come.

'When East meets East' in the West, then, indeed, will come the time; not for war, but for collaboration as regards output, not only of the rubber to send to market, but also of the food supplies for the labourers and their dependents on the spot. Bearing all this in mind, let us now consider what Mr. Woodroffe has to say on the future situation of the Amazon.]

CHAPTER XVII.

THE QUESTION OF FOOD PRODUCTION.

HOW THIS COULD AFFECT THE RUBBER INDUSTRY.

BEYOND occasional patches of mandive, beans, maize, and plantains, cultivation, properly speaking, is not practised on the Amazon, though every *seringueiro* could cultivate enough of these articles to support him if only he gave half an hour a day to a garden plot.

Before rubber became the paramount industry, rice was grown in the Lower Amazon in sufficient quantities to meet the local demand, and a large and flourishing export trade existed. Agriculture in general was practised and gave subsistence to a large proportion of the population; yet in less than a score of years all this has disappeared, and what were once fine *fazendas* are now ruins in the midst of jungle. Attempts have been made to revive agriculture in almost every State of the Amazon. Good practical men with labour at their command have looked without avail to the financiers and *aviadores* of Manáos and Pará for the necessary assistance. Certain *patrões*, who foresaw that the rubber industry would soon be in a parlous state, and for this reason desired to occupy their men in agricultural pursuits, were still obliged to continue working rubber, so it seems to me that, under present conditions, any attempt to establish cultivation on a small or large scale is doomed to failure from its inception. The *patrão* discourages the

seringuero from growing foodstuffs because it would lessen purchases at the former's store; the *aviadores* discourage cultivation because they want the maximum of rubber, and will not grant credit for tools and goods required to till the soil, fearful of a reduced output. Surely it is possible to overcome these difficulties in the way of the *seringuero*, as it is from a utilization of his spare time in a judicious exploitation of the forest vegetation that he must at present look for relief. Then, again, he can increase his food from a great number of such palms as Miriti, Assaye, Bacaba, Pupunha, and from a large variety of fruits and nuts too numerous to mention. Many of them would provide him with oil in place of kerosene as an illuminant. Cords for fishing and for making nets and hammocks could be obtained by utilizing some of the many fibres that abound. He has no need of cure-alls, as the forests are full of medicinal plants; the delicate inner leaves of many palms are good substitutes for vegetables, and for the collecting he has barks, resins, &c., at his very door, which, in the aggregate, would be a real gold mine.

A trade has been built up in the nuts of the Sapucaia, generally known as the Brazil nut, but the trade is capable of much greater expansion, as only those nuts which fall to the ground are collected, and owing to an inadequate labour supply only a very small proportion are recovered. This is a defect that an increased population would remedy.

The Andiroba (*Carapa guyanensis*) is slightly exploited in some parts for its oil, which is obtained in a very crude manner, not more than 30 per cent. of the 70 per cent. of oil which each nut contains being extracted. It is used locally as an illuminant, but in Rio de Janeiro it is used in candle and soap making. The nut of the Bieuiba (*Myristica sebi-fera*, Swartz) contains stearine in large quantities, 15 kilos producing 30 litres of oil under modern methods; and though

large quantities are used in Rio de Janeiro for candle making (the nuts for this purpose are derived from other parts of Brazil), not one kilo is exported from the Amazon. Other nuts to which this remark also applies are the nuts of *Myristica surinamense*, *M. mocoa*, and a host of others. Apart from the value of *M. mocoa* for the nuts, its timber should be in demand for high-class cabinet-making work; being white, closely grained, and easy to work, it takes a high polish, possessing great resisting qualities. The cashew is also another valuable tree which produces a very agreeable fruit to which is attached a bean-shaped nut. This yields an oil which has great medicinal properties.

Another common tree in the Amazon forests is the Copaiba (*Copaifera officinalis*), from which is obtained the medicine known as copahu. This tree, when tapped, yields a liquid not unlike turpentine, which when allowed to coagulate forms a resinous substance which is a variety of balata. The *seringueiros* could tap this tree without in any way interfering with their ordinary duties when tapping rubber, and its sale would be a source of great profit to them.

The Massaranduba (*Mimusops elata*) is common to the Amazon Valley, and could be exploited with profit. It produces a latex useful as a cement for repairing pottery, glass, &c. The latex, which flows freely, is an excellent substitute for cows' milk, being considered highly nutritious. When coagulated a resin is formed which has the same uses as gutta-percha. The bark contains a large amount of tannin.

The Muirapiranga (*Mimusops balata*) is in great demand for its timber. Each tree could produce about 500 grm. of gutta-percha, but though the tree is very abundant it is unexploited. The Bacuri (*Platonia insignis*) is another gutta-percha producing tree whose value is not generally

known, though the fruit is greatly esteemed by the *seringueiros* and others.

The trees above mentioned are not by any means all that are valuable for the oils, resins, &c., that can be extracted from them. In his book, "The Lower Reaches of the Amazon," Mr. Algot Lange goes largely into the matter of the Brazilian timbers, a subject in which he seems to have specialized.

The Amazon forests, apart from the trees that they contain, are remarkably profuse in shrubs and plants of economic value. That from which the paste known as *Guarana* is produced is too well known to merit a further description here. The Marapuama is greatly used by *seringueiros* as a tonic and stimulant, and is said to be of great benefit in cases of beriberi. The method of preparing the medicine is to make a strong infusion, the liquid being taken in doses of about four teaspoonfuls daily. Sarsaparilla is extremely abundant, and though its uses and value are well known there is no trade in the plant. The Svenpira (*Bowdichia virgilioides*) is another of the valuable plants to be found up the Amazon. The bark is an excellent depurative of great power in certain diseases of the blood; the seeds of the fruit when toasted are prepared into a beverage like coffee, the liquid being efficacious in the treatment of venereal and skin diseases. There are a host of other depuratives, too numerous to mention, well known to the forest dwellers, but which, in the majority of cases, are unknown in medical science, consequently unexploited. Other plants of value in medicine, though unexploited, are the nettle (*Urtica æstuans*), the Malugueta pepper (*Capsicum frutescens*), Assacú (*Hura crepilans*), Ipecacuanha, Jaborandi, and many others, too numerous to specify.

The judicious exploitation of these and other forest trees, shrubs and plants is a matter that merits the attention of

all who have the interests of the Amazon rubber industry at heart, and in this, as in other industries, everything depends upon the business houses of Pará and Manáos, who must once and for all abandon their past selfish tactics and create a demand and ready sale for the products obtainable from the forests, apart from rubber. Until they do this and help to remove all the difficulties at present in the way of cultivation and forest exploitation then the rubber industry of the Amazon must suffer.

That cultivation on the Amazon is possible and could be made profitable there is no doubt. Why should not every *seringuero* be given tools and assisted to clear a small patch of ground close to his hut? He could, by planting a few hundred cuttings of mandioca alone, be rendered independent of purchased *farinha*; rice grows well, and with little care, as also do maize, beans and bananas. The *seringuero* would reap the benefit in better food and cheaper living, and his health being better his output of rubber would probably increase. Though it is true that the *patrão* would sell less of the merchandise at present in demand and so would require to purchase less from the *aviadores*, who would also require less from Europe, they would, in the end, more than recoup this loss, as the *patrão*, *aviado*, *aviador*, and so on up the scale, would have less interest on outstanding accounts to pay, whilst the increased output of rubber at a lower cost would relieve the existing tension all the way round, and the money that the *seringuero* is at present forced to spend on over-costly foodstuffs, &c., would go to buy other goods at a legitimate value and profit, and so, in time, build up a safer, fairer, and more widely spread trade than any of the houses have enjoyed up to the present.

If all this can happen solely from assisting the *seringuero* to cultivate a garden patch, why should one of the richest alluvial soils in the world be abandoned to forest growth

and harbour insect and other pests to the detriment and discomfort of the rubber gatherer. Cheap labour could be introduced, not necessarily from abroad, and cultivation on a large scale be instituted. When it is necessary to cut down large tracts of forest, instead of allowing the fallen growth to dry and then burn it, irrespective of its value, it could be made fairly easy and profitable to separate the valuable timber and burn only the grass and trash. This should burn easily to ashes to avoid expensive clearing up, and then, mixed with the surface soil, would greatly improve its quality.

With the necessary financial support and intelligent practical administration a large tract of forest could, year by year, be cleared, burned and planted with bananas, whereby a first crop of fruit could probably be gathered within the first twelve months in sufficient quantities to cover the capital outlay and show a small profit for working expenses. Banana flour is an article of food of considerable value, and its manufacture is easy and cheap, since the unripe banana only is used in its preparation, avoiding having to wait for favourable ripening weather. [Brazil already knows about its manufacture, as the British Consul-General at Rio de Janeiro, some little time back, forwarded to England samples of a flour made from ripe bananas, known locally as "bananose." This preparation is stated to be a valuable article of diet, and arrangements could be made for shipments from Rio up to 10,000 kilos monthly. The flour would be packed in tins of 25 kilos. The price would vary from 1s. 6d. to 2s. per kilo, f.o.b. Rio de Janeiro. The time is opportune, we are told, now that wheaten flour is comparatively scarce and dear, for the introduction of this product, of which much was heard in India some years ago, and, if palatable, it should meet with a wide sale. If Brazil can produce banana flour to ship to England, she can also do so to feed the *seringueiro* and save her rubber industry.]

If the young banana plants are placed well apart, as they should be to allow them to develop, maize and beans can be sown within the rows. Both do well on new ground; the crops are ready for gathering within three months, and two crops of both could be got off before the first lot of bananas would be ready to gather. Mandioca of both the poisonous and edible varieties grows better under slight shade than in the open; the former would be a great asset for use in the making of *farinha* flour, if only to reduce the working expenses of the *estrada*, for *farinha* is a very large item in the food bill of the Amazon; when baked or fried it is used as bread to a great extent, and boiled as a vegetable replaces potatoes. Maize and beans, whether green or ripe, are excellent articles of food. Fowls, pigs, cattle, &c., can be profitably fed from these crops, while plaintain leaves, corn and bean stalks, &c., could be utilized for fodder until the improved cultivation produces a better class of pasture feed than is available at present.

In certain parts of the higher reaches of the Amazon, *mani* (ground-nuts) are grown on the small sandbanks which appear in the rivers during the dry season; yet in the Lower Amazon where sandbanks, many square miles in area, appear during three and four months of the dry season, such lands are rarely used, except by one or two fishermen, who grow a few melon plants, &c., upon them.

If in choosing a site for extensive cultivation one of these large *playas*, as the sandbanks are called, were selected, huge quantities of mandioca, maize, soya and other beans, ground-nuts, and other quick crops could be grown without any of the charges incidental to clearing ground; and owing to the absence of grass or weeds little labour would be required to attend to the plants, although two or three men would probably be necessary to keep watch in order to reduce theft and prevent damage by tapirs, capibaras, &c. The crops would not require irrigation, as there is always

plenty of moisture a few inches from the surface, due to filtration from the river. Bananas, of course, would not be suitable, as they require to be planted in ground above the maximum water level, as floods destroy the plants.

Another great advantage in using the sandbanks is the entire absence of such pests as the Sauba ant, and damage from pacas, cutias, or other rodents. The danger from ants is a very serious one, as at times they can do great harm to the growing crops. They come from long distances, and will strip a big tree of its leaves in a single night, whilst large armies of them have been known to cut and carry away in a few hours the leaves from an extensive plot of growing beans, &c. They are easily destroyed if search is made for their nests (generally found in red, sandy clay), and a charge or two of dynamite exploded over the galleries a few inches below the surface. Petrol or similar volatile spirit, if mixed with oil or water, and poured into the galleries and then ignited will also often exterminate the pests. Rodents, such as cutias, pacas, &c., could be trapped or shot, but owing to their high value as food should be encouraged and only thinned down when too abundant. A few dogs occasionally allowed to roam about the plantations would reduce risk of damage by either tapirs or capibaras.

Again, a very profitable plant which grows well in the Amazon, with little attention and without necessity for weeding, is the sweet potato, the sales of which would produce excellent profits. The leaves, &c., are good food for pigs and cattle. This crop is discussed more fully further on.

Tobacco grows well and a small local trade is carried on. The leaf is large and flexible and of first-class quality. At present, owing probably to the little care taken of the growing plant, the leaf, when made up into tobacco, cigars, &c., though of excellent aroma, is so strong as to cause

dizziness to the most inveterate smoker. Careful cultivation and an improved method of preparation, however, could remove this defect.

The soil of the Amazon Valley is almost without exception suitable for vegetable growing; cucumbers, tomatoes, radishes, kohl rabi, cabbages, okra, egg plants, and others giving remarkable results where irrigation, in a modified form, is practicable, as would often be the case were the waters in the uplands "bottled up" for use as required. Where the ground is high a small pump attached to a stage, which would rise and fall with the river, would perhaps be necessary and would cost but little. Power for certain necessary tools and machinery could be obtained from a small kerosene or similar motor, or some small stream diverted to obtain sufficient power to drive a water-wheel.

Veering off this subject for a moment, I wish to say that a writer upon the Brazilian rubber industry recently classed the women of the Amazon as vain, extravagant, and useless. Vain, or rather proud and exclusive, they may be; and who can wonder at this when one realizes how the men around them behave? Certainly, after eight years' experience of them and their ways I did not find them so; extravagant they certainly are, but not by any means useless, as Algot Lange's books will show. Whatever attempts have been made at poultry keeping, pig farming, cultivation, or the manufacture of *farinha*, they only exist or are kept alive to-day by these maligned women. They it is who look after the planting, weeding, and getting in of crops. They gather the mandioca and put it to soak to relieve it of its volatile poison; they gather and dry the few beans grown; they plant and gather maize for their poultry and animals; they find time to help the *seringuero* with his smoking, the hunter and fishermen in the salting and curing of meat and fish, or the preparation of baits and traps; and

the illustration in Lange's book (facing p. 70)* shows, in this case at least, that the wife can turn *seringuero* when ill-health causes the change to be necessary. They have become expert in the management of canoes, and do all this and still find time to bring up large families and attend to their household duties. The preparation of *farinha* is almost wholly dependent upon the women in the Amazon, and if the Brazilian does not want to be "snowed under" by the advent of foreign labour he must look after his women-folk with greater appreciation, and encourage and help them to supply the labour necessary for cultivation on a large scale, or must find some means of inducing the peaceful Indian tribes to assist. After many years spent among Indians, I am confident that, if they were assured that only agricultural pursuits would be required of them, and forced labour not imposed upon them, great numbers could be induced to live close to reliably peaceful and kindly "whites," in order to enjoy their protection from rubber-collecting slavers, and the advantage of the "give and take" that all appreciate on the borders of civilization. These Indians are practised in cultivation; they grow maize, bananas, beans, mandive, tobacco, coca, and many other useful plants with great success, and if well looked after by responsible State officials to impede their corruption and ill-use, Brazil would, in the course of a few generations, have acquired a class of agricultural citizens superior to many of the mixed types which it is her doubtful privilege to possess at present.

It would be of very little use to the Brazilian if foreign capitalists took an interest in banana planting for export, beyond the revenue which the Federal Government would obtain by taxing it. In thirty years Northern Brazil paid

* "The Lower Amazon."

to the Federal Government at Rio nearly £100,000,000 in taxes, without anything of real value to show for it, or the hope of any assistance in her hour of need. The real remedy is for the Brazilians of the North to plant bananas and every other suitable foodstuffs, and so make themselves independent of outside help for provisions and such necessities of life, using their increased incomes to buy household and agricultural necessities, estate supplies, ploughs, cultivators, &c. This must be their first consideration; and later, when the position of the rubber industry permits, then it would be time enough to discuss about exporting foodstuffs in competition with other agricultural countries. But before this can happen much has to be done by the Brazilian of the Amazon to set his own house in order and increase the supplies necessary for those around him.

CHAPTER XVIII.

HUNTING AND FISHING.

THE average amount required by a new *seringuero* to support himself during the whole of a *zafra* of about six months is not far short of £100, made up as follows:—

	£	s.	d.
Rifle or shot-gun	5	0	0
Farinha (6 baskets)	12	0	0
Sugar (40 kilos)	4	0	0
Coffee (20 kilos)	3	0	0
Rice (40 kilos)	2	0	0
Lard (16 kilos)	4	10	0
Xarque (dried meat, 50 kilos)	8	0	0
Beans (40 kilos)	3	0	0
Tobacco (15 lb.)	10	0	0
Kerosene (5 gals.)	1	10	0
Salt (15 kilos)	0	15	0
Powder (125 $\frac{1}{4}$ -lb. tins)	5	0	0
Soap * ($\frac{1}{2}$ case = 16 bars)	1	15	0
Cachaca (30 litres)	5	0	0
Medicine, clothing, caps for shot-gun, &c. . .	20	0	0
Sundries	5	0	0
	<hr/>		
	£90	10	0

* Note the cost of soap as a comparison

To this must be added all advances made for transportation, recruiting, &c., which put the average *seringuero* about £150 in debt before he begins his *fabrico*. The output of a good workman is about 400 kilos, and this, with rubber at its present price of less than 3s. per lb., can leave the *seringuero* with but little in proportion as his share, so that the amount put to his credit to pay off this debt of £150 is but small. *Seringuero* and *patrão* are alike, therefore, left in debt. If the foodstuffs in the above list, valued at nearly

£50, were produced on or near the *estrada*, how very different all this might be.

Taking the length of the *zafra* as 180 working days, it follows that the average daily amount of rubber produced is about $2\frac{1}{2}$ kilos, representing, roughly speaking, a wage of 4s. 5d. per day of nine hours, or 6d. per hour. Now, in a South American region, where living is comparatively cheap, this would not be considered a living wage, yet the *seringuero* manages to exist on it, but to ensure even this he must augment his meagre and poor food by hunting and fishing. In a district where game abounds he loses but little of his time, for he can almost always depend upon shooting something for the pot, while traversing the *estradas* to collect the latex, and at certain seasons can obtain a small supply of fish by means of traps. He is thus assured of a fairly regular supply of fresh meat and uses the *xarque* as a reserve for those days upon which he has nothing else, and even then will have very little left at the end of the *zafra*. In districts where game is not abundant, or large distances have to be covered to obtain it, a *seringuero* will need at least 75 kilos of *xarque*, costing anything from 2s. 6d. per lb. gross, and, be it remembered, before 1 lb. of *xarque* is fit for food, even when fresh, quite one-fifth must be thrown away in the cleaning, or cutting away of the dirty and damaged parts. Think, therefore, how the *seringuero*, and through him the rubber industry generally, is handicapped on account of this unnecessary lack of organization of the men's food supply. I have known cases where, owing to the carelessness of handling in transport, dried beef, beans, rice, and other delicate foodstuffs have been impregnated with kerosene from a leaking case placed on top of them. This has not been discovered until the food was prepared, and, of course, the loss then became the *seringuero's*. He either had to go without, or eat the damaged goods, in

either case to the detriment of his health, for it was useless then to think of returning the meat to the *patrão* or to get redress elsewhere.

Now every *seringuero* must have either a rifle or shot-gun, and often has both. A Winchester rifle costs about £4 in Manáos, and a shot-gun about half that amount. Gunpowder costs him about 5s. per lb., ammunition about 1s. 6d., and cartridges for a Winchester about 3d. each; but these prices do not refer to the distant river districts. They are those ruling in the *seringals* of the River Madeira, below Santa Antonio and in the Lower Amazon. In these regions game is scarce, and to obtain a week's supply necessitates the *seringuero* losing a whole day per week, and often more. It would pay him, however, to make the journey, as he is all the better for it in his health and his expenses for food are reduced; and, perhaps, he may have good luck and obtain enough meat to sell to his neighbours or to passing river craft, and use the money for such necessities as more ammunition, &c. By doing so, whilst his output of rubber may be decreased he will probably lessen the loss to himself and his *patrão* by the increased vigour he will acquire through the change, and the better food, &c., he can buy.

I have been asked more than once why the *seringuero* does not procure his game in his leisure hours, seeing that his day commences so early and the smoking of his rubber finishes early in the afternoon; in explaining the reason I have been obliged to explain that after midday very few animals or birds can be located in the forests. They feed, as a rule, at night or early in the morning, and while the sun is high they seek the shady depths to rest, and if disturbed during the heat of the day they will generally seek safety by hiding in preference to flight or fight, and so are only available to the hunter just when the *seringuero* is forced to give all his attention to the rubber trees.

In those *estradas* where large game is rarely encountered the *seringuero*, who habitually carries his gun, may possibly obtain squirrels, small monkeys, and game birds. If he is fortunate he may obtain just sufficient fresh meat to keep him going at the expense of two shots, or about 6d. per day; but the man who has to absent himself from his work for a day or more will hunt bigger game, such as tapirs, peccaries, deer, &c., and will, even then, rarely use more than four shots, costing about 1s., to obtain a good supply of fresh meat to last for a longer period; for instance, if he encounters a band of peccaries it is no uncommon thing for him to obtain perhaps three or four, one of which when smoked or salted will provide him with food for a number of days, and the remainder he can sometimes sell to his *patrão* at prices ranging from 7s. 6d. to 10s. each carcase, for which he takes payment in kind and so secures a corresponding benefit, and in this way, owing to the abundance of tapirs, deer, peccaries, &c., in some parts, the *seringuero* could rely upon a substantial increase in wages were the meat obtained readily disposable.

Perhaps it is the knowledge of this which causes the *patrão* and the *aviado* to look askance at hunting as becoming possibly a more remunerative and pleasant calling than the collection and smoking of rubber latex. It is undoubtedly reasonable to suppose that, in most districts, it could be more profitable to the *seringuero*, from the point of view of food, to lose whole days in search of game, for as it is there is little doubt that the number of animals killed for this purpose in the forests of the Amazon Valley alone is enormous. This being so, it is a pity that the skins, furs, and feathers are almost entirely wasted, whereas in the utilization of this waste the *seringuero* could benefit himself considerably and so render hunting and fishing profitable to a marked degree. The query arises, however, as to whether it is to the interest

of the exporting houses to encourage such side industries, and I fear that the reply must be in the negative; in any case, unlike India, the industry or trade in pelts, skins, furs, feathers, &c., from the forest denizens is unknown in the Amazon beyond a few jaguar, puma, and deer skins, which reach Pará and Manáos by accident and are sold to strangers as curios.

Thousands of monkeys are annually killed for food, the skins and furs of which could become of commercial value; principal among these can be mentioned the Guariba (*Myctes niger*), Muriqui (*Eriodes hypoxanthus*), Ei-a (*Nictephtecus trivirgatus*), and the Prego (*Cebus macrocephalus*). A trade could also be built up in the skins of members of the feline family: racoons, cutias, deer of many varieties, paca (a beautifully spotted skin), ant-eaters, sloths, tapirs, and wild pigs. The skin of the latter is not only useful in the manufacture of leather, but the bristles must be of considerable value, judging by the trade in bristles from India, China, Russia, &c., which has been established in London, and merits the attention of the Brazilians, since I am told that 30s. per lb. and over has been paid for exceptionally long, white bristles, if properly graded, washed and packed; black and grey bristles sell at lower but proportionate prices.

The Amazon forests are full of beautiful birds, most of which offer useful articles of food. Chief among those which are of value for their feathers are the various varieties of heron, principally the white variety, providing the egrets or aigrettes of commerce; the Guará (*Endoserimes ruber*), parrots, macaws, and parrakeets of many species, trogons, humming-birds, toucans, woodpeckers, kingfishers, and thousands of other very delicately coloured birds; and if the present agitation against the killing of egrets for their feathers tends to check the trade, egret farms or *garceros* could be formed here, as they are elsewhere.

The rivers also, needless to say, can and do provide the *seringuero* with much fresh food. The chief fish which is obtained is the *pirarucu*,* in which a small trade is carried on by native fishermen, who dry the meat in long strips. The *pirarucu* is common in most of the lower rivers and in the inland lakes. It is pursued in small boats (*montarias*), and is caught by means of the harpoon when swimming close to the surface of the water. The only part of the fish besides the flesh which is utilized is the tongue, used as a file or grater for domestic purposes; but the large bony scales, the bones, and other parts which would make excellent glue and manure, are wasted. The *peixe boi* (*Manatus inunguis*, Natt)† is caught in exactly the same manner; its flesh, which is highly prized, is an excellent article of food, not unlike veal when fresh, but not so satisfactory as *pirarucu* when salted and dried. Smoked, however, it is very agreeable. The skin of this cetacean would undoubtedly prove of value if treated in a manner similar to that of the porpoise, for making boot-laces, &c. Whilst the *pirarucu* is a very big fish, the *peixe boi*, when fully grown, measures about 10 ft. in length, and each animal yields from 175 to 300 kilos of oil. The trade which exists in this oil is, I believe, entirely in the hands of native fishermen, whose methods of extracting it are crude, laborious, and wasteful, yet it is in great demand for cooking purposes, and realizes from 5d. to 8d. per kilo in Manáos and Pará. A regular trade is carried on in the dried meat also, when prepared in its own fat and tinned.

* *Pira*, fish; *urucu*, fruit of the *Bixa orellana*.

† Called by some, I believe, the river cow, or manatee. The Spaniards call it *Manati*, from the Camb *Manatui* (see Webster's new International Dictionary). They belong to the order *Sirenia*, and genus *Trichechus*, and include the *T. manatus*, or American species found about the West Indies, Yucatan, &c.; the *T. inunguis* of the Amazon and Orinoco, and the *T. senegalensis*, of the West Coast of Africa. The dugong, to which it is allied, has a different tail, more like that of a whale, also fewer molar teeth than the manatee.—ED.

In this condition it is known as *mixira*, but the trade, both in meat and oil, could be extended and carried on at a larger profit than now.

The tartaruga (*Podæmenis expansa*) and other chelonios are also extensively caught in the Amazon, and are a very important factor in the food supply. There is also a local trade in the oil produced from them and in the flesh prepared in fat in the same manner as *peixe boi*, also known as *mixira*, but the shells, bones, &c., which would produce excellent size and glue, are wasted. During the dry seasons the turtles ascend the rivers to lay their eggs in the sands, and tens of thousands of them will visit one bank. The natives capture them at night, when the laying season is at its height, by simply turning them upon their backs. While in this position the turtles are helpless, and I have known as many as three thousand to be caught by less than twenty persons in an hour or two. Each turtle deposits from eighty to 150 eggs, which have no shells, but are covered with a thin, white skin, and are about the size of a golf ball, or rather larger. A very excellent oil is obtained from the eggs.

Other animal oils which are worthy of attention are those obtained from alligators, reptiles, and capybara (*Hydrochærus capybara*), the flesh of none of which is used as food to any great degree, whilst the residue, after the oil has been extracted, would make a good manure. These are great pests and their extermination would be a matter of little regret, whilst a trade could be readily established not only in their oils, but in their skins, &c., which would be valuable when tanned or used in the making of sizes, glues, &c., and besides the local demand for these oils, supplies could be sent further afield, even possibly across the seas. The difficulty at present is how to establish a trade in the skins, furs, feathers, animal oils, &c., without interfering with the *seringuero's* output, but this need not be insurmountable.

In the first place, it is not imperative that he should commence his tapping before daybreak. He could easily arrange to do this, say from 9 a.m., and rising at his usual hour of 4 a.m., devote at least four hours of every working day to hunting and fishing, to the benefit of his health in more ways than one.

Every *seringuero* rapidly becomes an efficient hunter and fisherman, and if encouraged could quickly become an accomplished trapper, which costs nothing in the way of ammunition, but needs a quick sight and active body in order to secure the quarry before your many competitors in the forests, human and otherwise, especially the latter, steal it from the traps.

The meat of the many animals, birds, &c., no matter how procured, would serve him as food, and their skins, feathers,, &c., if properly cured, would be easily saleable and of appreciable value in the aggregate.

Under the present system the *seringuero*, as has been shown, commences his day about 4 a.m. and finishes his labours early in the afternoon, yet he regularly wastes four out of the twelve hours of daylight, because he has never had any inducement to utilize his spare time, as any increase of pay so earned would be too serious a question for the *patrão*, since it would enable the man too easily to pay off his debts or to incur far smaller ones.

If the *patrão*, however, had an outlet for the skins, furs, feathers, &c., as well as of the forest products generally, he could buy them himself and resell them, just as he does with rubber, and his own profits would be very materially increased, whilst the *seringuero* would always find something to spend his money on and go back to the semi-luxuries of the three-dollars-a-pound rubber days, and so increase the trade generally to everyone's advantage, especially the *patrão*'s, if he could only realize it.

I do not advocate hunting and fishing on such a scale

as would tend to endanger the extinction of certain species, but seeing that such huge numbers of animals, birds, &c., are pursued and killed by each other, as well as by man for food, it seems to me that there is a big field for enterprise in the opening up of a valuable trade in what to-day is so much waste. If necessary, a close season could be introduced during which anyone found with the proscribed animals or birds in their possession would be liable to a heavy fine. A great benefit to the region would certainly ensue if the Federal and local Governments assisted the forest dwellers, by issuing pamphlets on the methods of curing skins, feathers, &c.; preparing bones of animals, birds, fishes, &c., for manure; the extraction of animal and fish oils, glues, &c., and even on establishing *garceros* and other breeding establishments. Expeditions ought to be fitted out to give instruction in the utilization of so much waste, both for the good of the State as well as of the individuals. Such efforts would certainly be productive of better results than anything which has been accomplished by a *Defesa de Borracha*, which is (or was) costing the Government and certain States such large sums of money and yet can never tell the *seringuero* or *patrão* how to help themselves, or to increase the trade and purchasing power of the regions they inhabit.

When travelling about the forests and rivers of South America I have come across villages of Indians, *Caucheros*, &c., and have been surprised at the varieties of animals and birds to be seen around the houses in a state of domesticity hardly ever attained by our own pets over here. Some of them had been slightly wounded, others had been acquired when young, and so brought to maturity at the expense of much patience. I have seen tapirs, capybaras, pacas, cutias, racoons, monkeys, ant-eaters, jaguars, pumas, and ocelots, to mention but a few animals, all tame and contented; and so even if later on they become unsafe, valuable skins

could be obtained by the time it was found prudent to kill the animals; while any attempt to enumerate the birds is impossible, as I have seen almost all the known species in domesticity. Do not imagine that they were captive, far from it; they were free in the centre of the forests, and at any moment could have returned to their natural element; yet the idea of collecting animals, &c., for museums, menageries, zoological gardens, &c., does not seem to have occurred to forest dwellers or, perhaps, the affection for their pets renders it difficult for the owners to dispose of them. Organized farms, however, could be established, and whilst the continuation of the species would be safeguarded, and their numbers and varieties even increased by interbreeding, a large, regular trade would be built up in the skins, feathers, &c.

Hunting and fishing to-day do not play any important part in the economic condition of the Amazon, beyond furnishing the forest dwellers with occasional fresh food, and any time so spent is condemned by the *patrões*. Until these short-sighted individuals, therefore, are educated to a higher standard, little can be done. It is the merchant, who at present looks only to the forest for rubber, who must establish a demand for the other products available from hunting and fishing; and if the Government cannot be induced to help, must do so himself. Any increase in the earnings of the actual rubber gatherers, no matter how insignificant, will have a great effect on the future of the rubber industry by reducing the cost of living to the *seringuero* and hence the cost of collection, and also by offering a new means for raising (a reasonable amount of) the fresh revenue rendered necessary by lowering the taxes on rubber.

The whole of the rubber industry is in the hands of the merchants of Pará and Manáos, many of whom are Brazilians. They have huge capitals locked up in rubber,

and if they do not interest themselves in hunting, fishing and forest products as auxiliary industries, in conjunction with others, they may rely upon an early death for their trade in rubber. If they are content to let it die, the bondholders and creditors of Brazil may not be, and so it behoves them to see what they can do to save, not only the rubber industry of the Amazon, but also the many other trades that could be generated in that region which teems with animal and vegetable riches to an extent that exceeds any other portion of the globe.

Neither the *seringuero* nor the *patrão* would suffer by this organization of the trade in Brazilian forest products; on the contrary, they stand to gain, as the regions would gradually be cleared of pests and dangerous animals, whilst all that is good would be protected and cared for so as to encourage and increase the number of men, women, and children, as well as of the useful animals, birds, fish, and even the vegetable life on land and in the water. On the other hand, once the rubber industry is laid low, the inhabitants of the Valley, rich and poor, would have to depend upon the soil, the forests, and the rivers, as do the roving bands of Indians, and would at once go back in their level of comfort and social status to an alarming degree, or would have to look to other regions for sustenance. In either case the lot of the individual must suffer greatly by a continuance of the present callous indifference, and the world generally stands to lose one of the richest markets that has yet been her lot to develop and "make good," unless a change takes place, and before very long.

CHAPTER XIX.

BRAZILIAN SETTLERS OF TO-MORROW.

THE most casual student of the history of Brazil must be struck by the comparatively few immigrants who have made the country their home during the past hundred years, especially if the Italian element be left out.

The first serious attempts to attract immigrants other than Portuguese were made early in the nineteenth century, when two German villages were founded in Bolivia and one Swiss village in the neighbourhood of Rio de Janeiro. In 1851-52 the German colonies of Blumenau and Joinville were founded at the invitation of the Emperor Dom Pedro, and shortly afterwards Petropolis came into being. Italians and French also emigrated very largely, like the Germans, to the South of Brazil, but, unfortunately for the country, Germany, in 1859, and subsequently France and Italy, passed laws prohibiting or restricting the further colonization of Brazil by their people.

In 1867, dissatisfied Southerners from the United States emigrated to Southern Brazil and founded small colonies, and about this period large numbers of Britishers also settled in the Republic. In 1910 the total population of Brazil, including (an estimated) 500,000 Indians (but their number must be larger), was, according to the census, about 21,580,000, and at the end of 1913 the total population was

estimated to be not less than 24,000,000 all told ; but of these comparatively few would pass as white in the United States, and the majority of the people of Brazil are a mixture of the descendants of Portuguese settlers, aborigines, negroes, and the descendants of these three races, and it is this stock, or at least the lower classes, that I should like to see crossed with the thrifty, resourceful class of immigrant that I have elsewhere suggested shall be brought out from the East. There is also a small proportion of Europeans and their descendants, mainly Italians, Portuguese, Spanish, Germans, Austro-Hungarians, Russians, French, Turks and Arabs, British, &c., but the illegitimate offspring from such, through neglect or bad surroundings, do not, as a rule, grow up to be a credit to the country. And the more the pity that it is so, for many such children, if given a chance, are bright and affectionate, but their nervousness makes them cautious and then cunning, and so their hard lot causes deterioration, to Brazil's loss. Some of the greatest tragedies on this earth have, I am sure, been worked out in the brains and on the bodies of the illegitimate children of Latin America. Probably it is the same elsewhere, but I speak here only of what I know.

The total number of immigrants to Brazil for the years 1907-1912 inclusive, was 652,605, as follows :—

1907	...	...	...	..	.	...	67,787
1908	...	...	...	.	.	.	94,695
1909	..	...	...	..	.	.	85,410
1910	..	..	..	..	.	.	88,564
1911	..	..	..	.	..	..	135,967
1912	...	..	.	.	..	..	180,182
							<hr/>
							652,605

The distribution of the nationalities of the 180,182 immigrants to Brazil in 1912 (124,612 of whom were agriculturists) may be taken as fairly representative of later years. The figures were as follows :—

Portuguese	...	...	...	...	...	76,530
Spanish	...	...	...	...	...	35,492
Italians	...	...	...	...	...	31,785
Russians	..	...	...	...	...	9,193
Syrians	...	...	...	...	...	7,302
Germans	.	...	...	...	...	5,733
Austrians	...	...	...	...	...	3,045
Japanese	...	..	...	...	...	2,909
French	..	..	...	...	...	1,513
English	..	..	...	...	...	1,077
Various	...	..	...	...	...	5,603
						<hr/> 180,182

The tide of immigration to Brazil has always been directed towards the Southern States, and the approximate number of immigrants who have settled in Brazil during the course of the last one hundred years is stated to have amounted to 4,250,000 souls, including :—

Italians	...	...	..	..	...	1,500,000
Portuguese	...	...	...	..	...	800,000
Spaniards	...	...	...	..	...	400,000
Germans	...	...	...	..	...	100,000
Austro-Hungarians	...	..	..	..	...	80,000
Russians	..	..	..	..	...	80,000
French	...	...	...	...	...	25,000
Turks and Arabs	...	..	...	..	...	20,000
British	...	...	...	..	...	15,000

It must be borne in mind that these figures represent only settlers, for Italians, Portuguese, and Spaniards have always been accustomed to remain but a few years in Brazil, eventually returning to their own countries. Their influence in the formation of the race has been far-reaching owing to a certain laxity in the marriage laws, and often to the difficulties encountered by those of mixed birth wishing to marry, but the illegitimate children are left behind in Brazil with the mothers.

The true Brazilian is supposed to be a descendant of the Portuguese crossed with pure Indian, and those, if any, that are so, probably offer the best type to be found in the North. The mixing of Portuguese with the virile, acclimatized Indian races of Ceará, &c., are supposed to give a vigorous, hardy offspring, fond of his country and able to

hold his own in defending it. These men, unfortunately unaware of what Jethro Tull in the past, and Dr. Widstoe to-day, have taught us about the conservation of moisture in dry and semi-arid areas, popularly known as dry-farming, abandoned their own land owing to droughts and consequent poverty, and being attracted by tales of wealth to be easily obtained from the rubber forests have migrated north, and in time, from all accounts, will form a large proportion of the *Caboclo* people of the Amazon Valley. This, however, is a serious mistake, as Brazil will find out later on. Not only should no Cearenses go to the Amazon, but one day I hope to see the surplus population of the Amazon find its way to Ceará, taking with them, perhaps, some method of diverting the surplus waters of the big rivers to Ceará and so save that country for cultivation by means of irrigation canals, as Mendoza has been saved in Argentina.*

The Portuguese to-day form a large proportion of the urban population of Brazil, but their natural characteristics not tending towards agriculture, but being, if anything, purely commercial, they have not set up either as manufacturers or agriculturists, consequently they have hitherto had but little share in the development of the country's natural resources; [and, the same as with South Africa, until South America, Brazil or elsewhere, has a substantial surplus in its population beyond that required for agriculture or mining, it will be no use to think of setting up factories,

* Those interested in dry-farming should remember that every year a congress on the subject (in connection, I believe, with an exhibition of the products as well as field demonstrations of the methods employed) is held at a leading centre in America (generally) or Canada. I contributed papers to the Tulsa Congress in 1913, and to the Wichita one last year, 'see pp. 200-207 in the proceedings of the latter for my paper on "The Progress of Dry-farming in the Tropics." Copies can be obtained of the Secretary of the International Dry-farming Congress, Denver, Colorado, U.S.A. (where the next and tenth Congress

otherwise to do so you would have to protect the few factories so outrageously that the prices to be charged to the public, must become prohibitive.

As they are to-day, when thrown suddenly on their own resources, as they have been since the Great European War started in 1914, the Brazilians seem unable to go ahead, and consequently their whole life and commerce, imports, exports, agriculture and production generally are pulled up dead, or, worse still, thrown into a state of chaos or panic. They are just like the spoiled sons of rich fathers or mothers, who, never having had to shift for themselves, thanks to the big allowances they could draw upon and of being aware that even their debts, when contracted, will be paid and peccadilloes smoothed over now and again, suddenly find themselves thrown upon a cold, hard world, intensely earnest upon fighting out its own battle of life, and so inclined to drive all weaklings, slackers, and inexperienced greenhorns to the wall, not out of unkindness, but simply because such folks are pitched out of the way owing to the pace set by the real worker of to-day. It is purely a question of gravitation, and once pushed out, if they are able to fall on their feet and get into line with the hustlers, they are just as welcome as anyone, and given full credit for the "grit" they showed in doing so; but fate is inexorable, and they must get into line or go.

So it is to-day with the Brazilian. The pace at the moment has slackened considerably, at times business even seems to have stopped altogether. Cannot Brazil, therefore, once in a way, try to fight out her own destiny and not draw on others to pay her debts? Must she again let the present opportunity slip by of letting in those who will organize her rubber industry, drain, cultivate, and plant up her lands and so increase her wealth, that wealth which exceeds the dreams even of Aladdin or Ali Baba, did Brazil

but know the means or word which will give her access to them?

Must she still have the loan that missed fire owing to the war? Surely not, if those are to prevail in Brazil who really love their country and are willing to fight and make sacrifices for her only one-twentieth to the extent that the Belgians have done for their country over here. Brazil will tell you to-day that what she needs are ships to carry her goods to buyers, but shrewder men elsewhere tell you that it is not the impossibility of securing ships that is troubling the Republic, it is the lack of large regular supplies of produce, like her coffee output, to export that is at fault; in a word, if Brazil wishes to prosper she must develop more, spend much less, and borrow not at all. South America, Mr. J. P. Wileman, of Rio, told us as late as the middle of last January (1915), has borrowed too heavily and recklessly already, she will be all the better for being forced to depend for a time on the development of her own resources. To this I would add, so far as Brazil is concerned: may the war and its after-effects long force her to do so; that, and that alone, may save Brazil, and it is because I think so that I am hurrying on to publish this book at once, at a time when most folks think it is a mistake to issue it at all.]

The pure Portuguese have always mixed indiscriminately with the Brazilian in the cities, forming families and relationships which, as a rule, they abandon when returning to their homes with whatever money they have acquired by industry and thrift. Probably they were aided by the mother of their children, if not the youngsters as well; and yet in many cases they leave their children and the mothers behind almost wholly unprovided for. These are little details to remember when the superior European wishes to keep the Oriental outside Brazil as being unfit to mix with them. The Chinese and Japanese that come must not be allowed

to abandon their children, and probably will not want to do so. On the whole the Portuguese race has undoubtedly had a great influence in the formation of the Brazilian character, but has left few real benefits and many defects behind it, whether in education, literature, art, agriculture, or the ordinary attributes of good citizenship. [If Brazil is to prosper and pay its debts out of revenue all this must cease; but can it do so, so long as inconsequent and selfish, if not actually vicious, fathers continue to beget reckless, careless because illegitimate children, fond of show, but not of persistent, thought-requiring work? Brazil at present is full of these children of all ages, hence the reason why we want shrewd, brainy workers like the Japanese, and steady agriculturists like the Chinese, to leaven up, or rather leaven down, this over-airy race.

Going back to what Mr. Woodroffe has to tell us, the Italians have visited Brazil in increasing numbers since the beginning of the latter half of the nineteenth century, but have always shown a predilection for the Coffee State of São Paulo, where there is a large and flourishing colony. But that colony also has its troubles, as is shown by the following speech by Dr. Rodriguez Alves which he made on the coffee situation, on the occasion of his reassumption of the Presidency of the State, and which is worthy of note as showing to what straits even São Paulo, with all her coffee, had come, because the credit of Brazil was so low. "Bad savers make bad borrowers" is a saying that every Brazilian would do well to bear in mind. Dr. Rodriguez Alves referred to the planting and coffee crisis and told his listeners as follows* :—

" Internal occurrences, aggravated of late by international

* I am quoting this from *Wileman's Review* of January 12th, 1915, p. 12.—ED.

complications, have at last culminated in a financial and economic crisis of the gravest character, that could not fail to affect the interests of São Paulo, unquestionably the most powerful element of support of national economy. Should the Federal Government, weakened as it is by the crisis, be unable to find prompt solution for the difficulties in which the whole interior is involved, it may at least be expected that something will be done to relieve those of São Paulo. The basis of São Paulo's future is coffee. Coffee it is that represents the most valuable instrument of the nation's foreign exchanges. Should it disappear from the list of exports, it would be impossible to find substitutes to take its place in the planting world. Both the Federal Legislature and Government recognize the seriousness of the position and are not inclined to abandon the planting interests.

“ Besides the competition of other countries, stimulated by the suspension of planting in São Paulo and by the falsification of coffee in the United States, we to-day have to face the difficulties arising from impaired credit, loss of markets, and complete disorganization of oversea transport. Difficulties so overwhelming demand the active co-operation of the Federal powers. My administration will continue on the lines laid down in my inaugural message to Congress, whilst modifying my plans as regards railway service to meet the actual financial situation. I must advise you, for one thing, that we cannot think of undertaking fresh construction at this moment when the State Treasury is so straitened and credit so difficult. There is, however, railway reorganization to be undertaken, to which I shall give special attention, but I am not in favour of ‘ trusts ’ as a solution for the working of our railways, but rather, if consolidation is requisite, that it should be undertaken by the State itself.”

There are, however, a number of small Italian colonies in other parts of Brazil which, like the Portuguese, have also played an important part in the development of certain districts, but their influence in the forming of the Brazilian race has been more the outcome of a lax moral system in the cities than one of any real benefit to colonization. All the same, since what it is, the Government must take its people for what they are worth, develop what is good in them—and there is much good—and train and breed out that which is bad; and the sooner they start to do so the better.]

This is particularly true in the towns, as the Italians do not easily mix in the social life of the better class of true Brazilians; nor do they, like the Portuguese, easily become assimilated with other races. They are extremely conservative, and when they form settlements have their own schools and institutions. Their children are brought up in the mother tongue and, when legitimate, are taught loyalty to the race and creed of their fathers rather than to the country which gave them birth; consequently, they can hardly be considered desirable colonists as factors in the formation of new types for the peopling of Brazil for the future. This being so, and the fact that the Italians account for 1,500,000 out of a total of $4\frac{1}{4}$ millions, or over 35 per cent. of the total settlers in Brazil during the past hundred years, shows how necessary it is to look for another race to do what neither the Italians nor Germans show any signs of doing, viz., mixing with the lower classes and so improving the breed and increasing the numbers of the true workers of the Republic.

They, however, have been highly successful in developing the natural wealth of São Paulo as small-holders: but the Italian population of Brazil is a moving one; whatever riches they may acquire rarely remains in the country, but

find their way to Italy. During certain months of the year large bodies of Italians emigrate to Brazil and the Argentine as agricultural labourers, but the majority of them remain only a short period and then go home again and take their money with them, like most of the East Indian emigrants do that go to the West Indies, Fiji, &c.

The Italians remain apart from the Brazilian and other outside influences. Wherever they are found in settlements or colonies one is immediately struck by the purity of their stock. In their large settlements they intermarry among themselves and thrive, but remain almost wholly loyal to their race, though professing a certain loyalty to the Republic, which is more apparent than real. In their smaller colonies, owing to intermarriage among themselves, they rapidly degenerate under the influences of atavism, of which there are many examples in the small agricultural colonies founded by them all over South America. There are, however, exceptions in a few districts where they have formed part of a mixed population of small-holders, as in Curitiba, &c., but even here they tend to generate into a very low type of agricultural labourer, which one feels could and would be improved if they went farther afield for their wives. Given a better organized and more opened-up and settled country, however, is it not likely that the Italians, even those who have returned to Europe, would keep more in touch with the centres in which they have settled, either trading with friends or relations left behind?

The influence of Spanish immigration has been very little felt, as they have been mainly employed in the building trades as masons, bricklayers, painters, plasterers, &c.; but with a better agricultural outlook their numbers should increase considerably, especially since Spain no longer has either Cuba, Puerto Rico, or the Philippines to turn to.

Poles, Austro-Hungarians, Russians, and French have

formed colonies in the States of Parana and Rio Grande do Sul, and adopting agricultural pursuits have remained.' Their influence as colonists in the building up of the nation has been almost *nil*, for their colonies and settlements were formed in isolated regions, with the result that they have not, owing to the scarcity of neighbours, become assimilated, either with the Brazilian or other people. They have also retained their own languages and customs and remain apart from all political or social influences, and it remains to be seen how they will spread out when the country is more accessible for travellers, and if they will be in a position generally to attract more of their countrymen to join them. According to later news, two at least of the States are arranging for Belgian refugee families to go there and settle as well.

The Germans are well established in large colonies in Southern Brazil, principally in Santa Catharina, Rio Grande do Sul, and São Paulo, as well as at the large centres of commerce. They have preserved their own tongue and natural characteristics unaffected by any outside influences at all. While professing loyalty to Brazil many of them are inherently Teutonic, and seem obsessed by dreams of an expanded Prussian Empire at the expense of everyone else, a fact which gave rise to a "German Peril" campaign in the national Press, though it has been dropped to warn the nation of the newer "Yellow Peril." Personally, however, I believe the only peril that Brazil runs from the yellow race is their absence among those helping to develop the country. Meanwhile the German influence in the political and social life of certain parts of Southern Brazil is a large one, but elsewhere it is restricted almost wholly to the coffee and cacao States and certain of the agricultural districts. They have obtained control over vast areas dedicated to agricultural pursuits, and have built up large and

important centres, purely German in their organization. German is taught in the schools, they publish their own newspapers, and they speak Portuguese only when absolutely compelled to. Though Portuguese is the official language of the State, many of the children of these German colonists cannot speak or write it, not even those of the second and third generations born in Brazil. It is of common occurrence for Brazilian domestics, when entering the service of families in these colonies, to be obliged to learn German, instead of the colonists and their children being taught the Portuguese tongue.

Some of their cities are entirely Teuton, mayor, councilors, police, and the soldiery being purely German in thought and training. They retain their *Sangerbunds* and *Vereins*. There is no doubt they would be loyal defenders of Brazil in almost every emergency which did not interfere with their racial ties, but there is a rapidly growing tendency towards emancipation and separation from Brazil, whilst the present war shows to what a state Brazil has been brought to through trusting to Germany for even a portion of the financial support required.

British, Turkish, Arab, and other immigrants are distributed all over Brazil, mainly in the cities, where they are employed in commercial and industrial pursuits, their number being so small that they have had little effect on the evolution of the Brazilian race, except financially, as in the case of the British.

Look where one will and it must be allowed that where organized immigration has been established the efforts made by the different races of immigrants in the colonization of certain parts of Southern Brazil have, with but few exceptions, met with great success, large tracts of barren and unproductive soil having been converted into flourishing

regions. The majority of these colonists began as homesteaders, and then rapidly developed into small-holders and peasant proprietors, who, having dedicated themselves to agricultural pursuits and put their heart into the work, have become rooted to the soil. This being so, why should not the far richer lands of the Amazon be drained and rendered habitable and then populated and developed by the half-bred *Caboclo*, plus the Indians and Orientals. The encouragement given to the peasant proprietors and individual colonists elsewhere has given far better results in the development of large areas than would have been possible under concessionary rights developed by controlled labour under large and powerful landowners (whether imported or otherwise), and alien company-controlled concerns, and since the Europeans can never and never will be suited for such work along the Valley of the Amazon, we must look elsewhere for the help needed.

The State of São Paulo is the only Brazilian State which conducts an independent Colonization Department; and it has been enormously successful with it, showing every sign of becoming in the near future one of the most densely populated and flourishing regions of the Republic, with a large amount of urban property in the State held by foreigners, mostly Italians, Portuguese, and Germans, and a few Spanish, Syrian, French, and others. Its only fault lies in its having all its eggs too much in a single basket, viz., coffee. Once it can remedy this, then São Paulo will outstrip Amazonas, or it will be an interesting struggle for commercial and economic supremacy to be amicably fought out between the two.

As showing the success of colonization under the protective auspices of the Government the following facts and figures speak for themselves: In 1909 there were sent to

various Government colonial farms the families of immigrants of mixed races as follows (including no British):—

Austrians	..				5,674
Germans	.	.	.	.	1,846
Dutch	..	.	.	..	873
Russians	..	.	.	...	576
Portuguese	.	..	.	...	141
French	.	.	.	.	128
Italians	.	..	.	.	9
Belgians	.	.	.	..	6
Brazilians	.	.	.	.	2,550
					<hr/> 11,803

The principal products of these colonies included an ideal assortment and consisted of maize, rye, wheat, oats, barley, flax, rice, beans, peas, lentils, potatoes, ground-nuts, arrowroot, mandive, tobacco, sugar-cane, cotton, bananas, pineapples, onions, melons, pasture grasses, and horticultural products; it only remains for the rubber area to start to "do likewise."

In 1912 the total value of the products from these colonies was valued at 1.165.739\$200 (£77,716), consisting of 854.009\$900 (£56,934) from agricultural products, and 311.729\$300 (£20,782) from stock, industries, and horticultural products. There also existed on the farms of the colonists large numbers of poultry, cattle, horses, goats, sheep, and pigs; the value of the cattle alone representing 244.631\$000, or £16,309 sterling, and these are "lines" that I am most anxious to see attached to every *seringuero's* or settler's homestead along the Amazon.

The colonies above referred to are all situated in unfavourable districts, necessitating much hard labour and industry to prepare the ground for cultivation; far better results, therefore, should be forthcoming from the fertile lands of the Amazon than from the foregoing, and yet, in Brazil's most fertile and prolific region, no serious commencement has been made in colonization, even to produce

foodstuffs for local consumption, much more for export to other States or overseas.

The only immigration to the Amazon Valley has been that of the Cearenses, subsequent to the droughts of 1879-80 in that State; but advantageous as this may have been to the rubber interests, I am quite sure it will ultimately prove to have been a great mistake for Ceará and the Federal States as a whole. The drought which drove these folk from their own region should have kept them at home determined to fight it; what the final results of this depopulation of Ceará may lead to can be easily realized if you turn to Spain of to-day and compare the present state of many of its agricultural districts with what they are said to have been in the time of the Moors.

When comparing the people of North and South America one is immediately struck by the differences in the inhabitants of the two countries. The United States of North America, although of Anglo-Saxon, Teutonic, Slav, and Scandinavian origin and colonization, is to-day entirely English in speech and general administration, although the national spirit is derived from a heterogeneous mass of races and creeds, often very conflicting in its nature; and it is this conflict in the past which forced the English, being the best organized element, uppermost. At the same time, as already pointed out, the North American is greatly prejudiced against the "coloured" races down South, a race which, even if quite white, would still cause Uncle Sam to see "blue" on account of its slow, procrastinating, and oscillating character, compared with the hard-headed, cock-sure hustler "up North."

The southern portion of the continent has been Latin from its earliest discovery, and is peopled almost wholly by people of Latin origin, interbred with the Indians. The mixing of Portuguese, and to a certain degree of Italians,

French, and Spaniards, amongst themselves, and with the Indian and negro blood, has evolved a race of people still purely Latin in speech, thought, sentiment, and religion—and drawbacks.

The rule of the priesthood has had a great deterring influence on the development of Brazil, but there are no religious disabilities of any kind to-day; and since the expulsion of the Royal Family, although the national religion is Roman Catholic, here, as elsewhere, it is the women and the lower classes mainly that support the Church. At the same time, the priests have always had a powerful hold wherever the Italians are numerous; but the true Brazilian of Portuguese descent, the same as the Spaniards in the other Republics, is little influenced by the religious teachings of the priests, though the women folk are exceedingly devout. Many of the male members of the population despise and even dislike the priests, who alone are to blame, and there would seem to be a rapidly growing anti-clerical party, whose object is to drive them out of the country. This, however, would only help to further disorganize society, whilst with the advent of large numbers of immigrants, so radical a change would come over the whole fabric of society that the influence and utility of the Catholic priests would become as insignificant as it is in England or France to-day.

In the formation of the Brazilian nation the Portuguese have had more influence than any other nation in the quality of the blood in the people; but the French and Italian colonists have left their influence on the literature, science, and art of the races, and throughout Latin America generally the statuary and pictures by Latin Americans contain much to admire and nothing to quibble over.

A race which has had such a splendid lineage as Brazil, springing from Portuguese, Italian, and French stock,

ought not to have any difficulty in attracting large bodies of suitable immigrants to the Amazon, to develop its natural resources as others have already done of late years in the Southern States of Brazil. It only wants a little organization to put things straight, but up to the present that "little organization" has been conspicuous only by its absence, except when it is a question of a new loan.

Italy, Portugal, Spain, and France have, while assisting in the formation of the race, done very little in the exploitation of the agricultural and mineral resources of the country beyond their own spheres of influence in Southern Brazil, and the mineral potentialities of the Republic yet to be developed are beyond estimate. Germany, Russia, America, and Great Britain have also provided Brazil with immigrants, but, unfortunately, their influence in the formation of the Brazilian people has been slight, and confined to the temperate open plains of the Southern States.

It seems to me that European immigrants have always been attracted to the South, for the very simple reason that, accustomed to moderate temperatures, they have preferred to struggle in converting waste areas into profitable agricultural and industrial centres, rather than develop the uncertain future riches in the tropical forests and rivers of the Amazon Valley. This has always been the case, and for many years to come must continue to be so, unless the Chinese and Japanese are freely introduced; for, apart from the dislike of the European to living and labouring in very hot countries, he is entirely unsuited for life in the Amazon Valley. So will the Oriental be, you say. That is quite true, but then no one can deny that without a big population in its rubber zone Brazil will go down before the East as a producer, and since no European influx can be expected, and the *Caboclos* are insufficient, someone must draw forth the Indians, and by mixing the Orientals with them and

the *Caboclos* can we alone hope to save Brazil from the financial collapse that will soon be hers if she does not bestir herself and overcome her race prejudices.

Recognizing, therefore, that Brazil must have immigrants to populate and develop the States of Matto Grosso, Ceará, and the rubber forests of the Amazon Valley, and admitting the unsuitability of the European as a labourer in the future developments of the resources of these regions, there can be little doubt that Brazil must look elsewhere than to Europe for her immigrants. Among her own people of the Southern and Central States she has few who could be induced to abandon their homes in favour of the Amazon; and no wise Government would wish them to, for robbing Peter (*i.e.*, Southern Brazil) to pay Paul (the Amazon Valley) benefits no one in the end, especially as Paul seems likely to consume his share and Peter's as well, judging by the way things have gone up to now.

The Cearenses, of all the Brazilians, are the most suited for the colonization of the Amazon Valley under proper protection and control. They are accomplished foresters, hunters, and fishermen, and if given better sanitary and improved general conditions, can well stand all the disadvantages of life in the Tropics. They would, under proper control, rapidly increase in numbers and become valuable citizens; but the great inconvenience attached to a general colonization by the Cearense is the necessity of his labour at present in the further extension of the rubber industry, and the serious menace to Ceará by this continued drain on her best and most pushing people. When the Amazon lands are drained and broken up for cultivation, however, the Cearenses may then come, mix with those already in the Valley, and rear up children who will be willing to go back to Ceará when they find the Amazon too hot and damp for them.

The negro and negroid races of Brazil, whilst capable of prolonged exertion and heavy labour in excessive heat, are of less value and often quite unreliable when left to themselves, owing to their want of initiative and to their erratic (or rather, spasmodic and impulsive) temperament, causing them at times, especially when half-breeds or quadroons, to fall short of what they promise to do at the start. They are, however, splendid fellows generally, and have done well as independent miners in British Guiana, Venezuela, &c., and when well handled and understood are loyal, cheerful, and willing to a degree rarely attained in other races, mixed or pure. Most "whites" who have lived for any length of time in the Tropics have tales to tell of how their black servants have (in spite of their truculent, bombastic ways) left behind a pleasing memory, and created feelings of genuine and lasting gratitude in the minds of their "white" masters and mistresses for help given readily and spontaneously, even at the risk and cost of the black's life, in time of danger and stress.

Though slavery has only been entirely abolished since 1888, one cannot help being impressed by the almost entire absence of racial prejudice, either among the negroes themselves or on the part of the whiter Brazilians, against their black brethren; and if not prejudiced against the blacks, why be so against the Oriental? It can only be that the least pushing and inefficient race is afraid of the competition that may be introduced will force those in Brazil to work hard and steadily or go to the wall.

Much could be, and must be, done in time by inducing the Indian population to leave the forests and inhabit the banks of the rivers; but how long it will take before the Indian can overcome his distrust and actual hatred for the white man, who has so cruelly persecuted him in the past and deprived Brazil of what would have been, under ordinary

circumstances, a large and very important peasant element, remains to be seen. Establish the new-comer in the shape of the even-going, level-headed Chinaman, as a go-between the white and the red, and then, I believe, you will do more to draw the Indian to the land in the next fifty or hundred years than can be done in five hundred or a thousand years as things run at present. With the Orientals and the Indians, Brazil will probably add 10,000,000 souls to her present population within the first fifty years, after 50,000 Orientals have been settled in Brazil at the rate of 10,000, or even 5,000, Easterns per annum, and 30,000,000 (provided the Orientals continue to arrive) within a hundred years of that period.

CHAPTER XX.

THE FUTURE HOMESTEAD OF THE *SERINGUERO.*

By THE EDITOR.

CATTLE, FORAGE, AND FOODSTUFFS.

THE statement attributed to Malbie Babcock, the American, that "our business is not to get ahead of other people, but to get ahead of ourselves," is certainly very applicable to Brazil. As a country the Republic is sound enough, all that it needs is to be developed; it needs, in fact, to get ahead of itself, and go ahead it will one of these days; the only query that remains to be answered being, Who will put on the steam, and who will act as the fuel, whilst Brazil figures as the engine? I suggest that the foreign creditors shall do the first; a reliable class of Chinese, Japanese, and their ilk can serve as the steam stimulators; whilst Brazil is the intricate and beautifully made piece of mechanism which, once understood and properly handled, will astonish everybody with what it can do, and the rate at which it can go ahead without showing the least signs of becoming exhausted or fatigued.

It is only a matter of will and grit to make the first move, and surely these two qualities are not wanting. "I think it rather fine," Arnold Bennett tells you, "this necessity for the tense bracing up of the will before anything worth doing can be achieved. I rather like it myself. I feel it to be the chief thing that differentiates between me and

the cat by the fire." The present stern necessity of Brazil bracing herself up to set her economic household generally in order, and to put her rubber industry in particular on a footing which will enable it to compete successfully against its own child, that has arisen like a storm cloud out East, should be, and must be, viewed in the same light. Every true Brazilian and every true friend of Brazil should experience a feeling of pleasure over the prospect of such a task, and should therefore set about it with a will, and at once.

Compared to what it could do, the imports and exports of the Republic, considering its area and possibilities, are very small, say :—

	Imports	Exports	Total
1902 ..	471,114,120	735,940,125	1,207,054,245 milreis
1912 ..	951,369,558	1,119,737,180	2,071,106,738 "
1913 ...	1,007,495,400	972,730,516	1,980,225,916 "

And when, as in 1913, you deduct the value of the coffee, 611,670,000 milreis; rubber, 155,630,000 milreis; and cacao, 23,904,000 milreis, making 791,204,000 milreis out of the above, it only just leaves 200,000,000 milreis for everything else. The only wonder is that Brazil has been content to allow so small a mouse to creep out of so huge a mountain.

It may be interesting to include here the following comparative outputs of coffee and rubber, which run as follows :—

COFFEE (BAGS).

	Rio	Santos	Total
Crop 1909-10 .	3,449,000	11,495,000	14,944,000
„ 1910-11 ..	2,438,000	8,110,000	10,548,000
„ 1911-12 ..	2,484,000	9,972,000	12,456,000
„ 1912-13 ..	2,900,000	8,585,000	11,485,000
„ 1913-14 ..	2,961,000	10,855,000	13,816,000
„ 1914-15 ..	3,000,000	8,750,000	11,750,000
(estimated)			

Regarding the 1915-16 Brazil crop, it is yet too early to give reliable figures. The general opinion was originally for a bumper crop, but owing to reports of continued

drought, smaller estimates have been given out by conservative houses, and the favourite figure at present for the Santos crop is, say, $10\frac{1}{2}$ to 11 million bags. The withdrawal of the usual financial assistance to the planters may reduce the yield. The 1914-15 crop, on the other hand, proved exceptionally good, having been harvested under most favourable weather conditions, and though early arrivals of the crop were of poor roasting merit on account of the unequal ripening of successive flowerings, later receipts were of exceptionally fine quality. But for the European War the course of prices and the development of the market would have been very different to what they have been. As it is, unless some definite measures are quickly adopted to prevent over-supply next season (1915-16), it is to be feared that prices will decline still further. It is not so much the planter that stands in need of protection, Wileman tells us as late as January 5th, 1915—that would be afforded him in any case by the depreciation of exchange—but the financial position of the country, which depends almost exclusively upon the maintenance of coffee prices to keep up exchange, so as to afford both the Government and importers the gold requisite to meet sterling engagements abroad.

We come now to the total rubber distribution of the undermentioned countries which, in 1913, ran as follows:—

		Tons		Per cent. of total
America and Canada	..	48,000	...	44'3
Great Britain	..	18,640	..	17'2
Germany	..	15,500	...	14'3
France	... ..	6,500		5'9
Belgium	... ..	3,000	..	2'8
Russia	... ..	9,000	.	8'3
Austria-Hungary, &c.	..	3,000		2'8
Italy, &c.	... ..	2,000	.	1'8
Scandinavia	... ..	1,500	.	1'4
Japan and Australia	... ..	1,300	..	1'2
		<hr/>		<hr/>
		108,440		100'0

Of which Brazil supplied the following as her 1912-13 (June-July) output:—

Upper Rivers:—

	Tons
Fina	15,771
Entre Fina and Fraça	4,060
Sernamby (Scrap).. ..	3,200
Caucho (Castilloa)	8,331
	<hr/>
	31,362

Lower Rivers:—

Fina	1,200
Fraça	4,800
Sernamby (Scrap)... ..	4,200
Caucho (Castilloa)	1,800
	<hr/>
	12,000

Total	43,362
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Made up as follows:—

Upper Rivers:—

	Hevea	Castilloa	Total
Solimoës and Javary	2,360	298	2,658
Purus and Acré... ..	10,700	3,549	14,249
Juruá	4,224	645	4,869
Madeira, including Matto Grosso and Bolivia	4,198	2,463	6,661
Rio Negro	471	19	490
Iquitos	1,078	1,357	2,435
	<hr/>	<hr/>	<hr/>
	23,031	8,331	31,362

Lower Rivers:—

Tapajoz, Xingú, Tocantins, the Islands, &c.	10,200	1,800	12,000
Total	33,231	10,131	43,362*

* Akers, pp. 102, 103.

The January number of *The World's Rubber Position* gives the following estimate (pending receipt of further official figures) of the world's production and distribution of rubber (in tons) during 1914* :—

Production			Distribution		
Plantation	70,770		America	55,000	
Brazilian	37,000		Canada	1,770	
Rest	12,000		Great Britain	18,000	
			Germany... ..	13,000	
			France	7,000	
			Belgium	1,000	
			Russia	14,000	
			Austria-Hungary, &c.	2,000	
			Italy, &c.	4,000	
			Scandinavia	2,000	
			Japan and Australia	2,000	
				<hr/>	
Total	119,770		Total	119,770	

* See also *Indian Trade Journal*, February 18th, 1915.

The production for 1915 is estimated as follows : Plantation 85,000 tons, Brazilian 30,000 tons, and the rest 5,000 tons, or 120,000 tons in all.

It only shows how necessary it is for the whole of Brazil, and not only the Amazon Valley, to start at once and develop her industries, whilst calling others into being to increase the wealth of the country and to bear a portion of the State and local taxation ; whilst, above all, they would draw fresh blood and a largely increased population to the banks of the Amazon and to the neglected lands of Ceará, Rio Grande do Norte, Matto Grosso, and other States, and so adequately people the Republic generally.

Professor Wyndham Dunstan, Director of the Imperial Institute, in his Presidential address delivered at the inaugural meeting of the Third International Congress of Tropical Agriculturists, held in London (June, 1914), very rightly told his audience, which included the leading men from all quarters of the tropical and sub-tropical world, that " there is no subject at the present time in the whole field of human activity which demands greater attention than the organization of those agencies which make for the agricultural productivity of the tropical regions of the world. The subject is of importance to the native races of the Tropics, who are coming more and more under European control and influence, and who look to European knowledge and experience for guidance in increasing the productivity of the soil." This sentence could well have been put together for the Amazon Valley, since it describes to a nicety what that Valley needs, viz., the organization of those agencies (labour, land, products, rubber, river-ways, forests, &c.) which make for the agricultural productivity of tropical regions. Thoroughly organize Amazonas, and you will carry it shoulder high as the winner among countries for agricultural and pastoral productivity.

Abraham Lincoln said the same thing when he told us, "Population must increase rapidly, more rapidly than in former times; and ere long the most valuable of all arts will be the art of devising a comfortable subsistence from the smallest area of soil."

Think of the fish in the Amazon alone and of the wealth in this food and raw material, that abounds up and down the coast in the open sea and yet, from all accounts, the towns get far too little of this wholesome food to eat, and even the river-folk would do much better if they got more fresh fish. All this would probably be changed with the advent of the Japanese, who are past-masters in the art of making the seas and rivers of Japan give them of their harvest. Take the Chosen fishing industry as an example. This, we are told, is developing year by year and the amount of catch is increasing steadily. During last year 17,472 boats manned by 137,858 fishermen engaged in the business in Chosen waters, obtaining marine products amounting to 11,753,730 yen (10 yen = £1 sterling) in value. Of these 27,858 fishermen with 7,472 boats were members of the guild and the amount they obtained was 8,253,730 yen. To be more particular, 19,067 fishermen were Japanese with 4,580 boats, and their catch amounted to 6,360,500 yen, while 8,791 were Koreans with 2,887 boats, the amount of their catch being estimated at 1,893,230 yen. As it is, Brazil had to import 25,210,000 milreis of codfish, 4,250,000 milreis of preserved fish in 1913, and over 80,000,000 milreis of wheat and flour, all of which money could be saved to her people to buy manufactured goods or to otherwise develop home industries in one or other of the States if they produced the equivalent in native products.

"Nuff said" on this point, which I only emphasize, as it is really at the bottom of much that is troubling Brazil, viz., the lack of that energy and enterprise that should make

the people willing and anxious to produce their own food-stuffs and even to have a surplus to sell elsewhere; to brace themselves up, in fact, and help put the nation's economic household in order, as until this is done the country cannot expect to compete against the East as an exporter of rubber, and therefore can never hope to pay her debts out of current revenue. This means that she must go on borrowing money until the "crack of doom," or rather until the "crack of Brazil's credit."

In an article on "Economic Conditions To-day in Argentina" (which Republic I would claim has gone through the mill of adversity and the "fires of fortune" and misfortune), by Mr. George E. Roberts, of the National City Bank of New York, which forms the leading article in *The Americas* for December, that writer tells his readers: * "The fundamental strength of Argentina's position to-day is that her products are commodities that the world must have. Her reinforcements of foodstuffs and raw materials came just in time. There is no surer basis for commerce or for investment than these. The world will send its ships to the River Plate for all the grain, meat, and wool that can be piled upon its banks. . . . Amidst the great industrial development that has been going on in the United States and Europe during the last twenty years, agriculture has fallen relatively behind. One reason for this has been that in the previous twenty years agriculture had forged ahead of the other industries. During the period of railway building in the Mississippi Valley, while that great expanse of fertile lands was being offered practically free for settlement, there was literally an over-production of the farm staples, with the result that they fell to

* I am quoting from the very full review of the article in the January issue of the *Bulletin* of the Pan-American Union, pp. 57-62, but it would be well to study Mr. Roberts in the original.

unremunerative prices, and farming became an almost hopeless occupation, and the tide of migration turned to the cities; but by the time the cheap and readily tilled lands of the United States were in farms, the growth of the cities and towns began to restore the equilibrium between food producers and food consumers, and the price of foodstuffs and other agricultural staples, like cotton and wool; began to rise. These are the conditions that opened a new era for such countries as Canada, Brazil, &c., with their great areas of cheap and productive lands, although Brazil, so far, has not taken advantage of the chances thus offered her. With the rising prices of lands in the United States and the increasing value of farm products, capital flowed freely into these new countries to build railways and bring the raw lands into use. It was a natural and wholesome movement. The world wanted, and still wants, cheaper food and cheaper clothing to restore industry to its proper balance, and for these products South America has capabilities that, for all present purposes, we may consider limitless."

If the statistics of the world's wheat crops can be taken as an example of how the world's supply of foodstuffs tends to lag behind and even to go back, they should be carefully studied, so I will reproduce them from *The London Grain, Seed and Oil Reporter*,* which claims, I believe, to compile them from official figures:—

	1914		1913		1912		1909
Europe (in 1,000 qtrs.)	244,397	...	284,883	...	263,304	...	250,239
N. and S. America	158,775	..	143,030	...	150,008	...	135,247
Asia	...	...	44,727	...	50,882	...	51,708
Africa	...	...	8,211	..	10,415	...	8,022
Australasia	...	...	3,500	...	13,327	...	12,211
Total (1,000 qtrs.)	459,610		502,537		485,253		447,548

Hereby hangs a tale, which Brazil must study. Like Argentina, she, too, has products; but unlike Argentina,

* See also *The Indian Trade Journal*, February 4th, 1915, p. 216.

one of these products, viz., rubber, can no longer be classified as a commodity that the world must have—must have, that is, from Brazil, for the East tells you she will kill out the demand for the Western product, since its cost is altogether too dear—and so Brazil, if she does not put her house in order, may and will lose the demand for her rubber, in the same way, as farther south, she will lose favour with her big cacao output if the planters do not organize and combine forces more than they have done to prepare not a cheaper article, but a better, because a more reliable one. Of the bulk of the Bahia cacao, the “fair” type is altogether uncertain in its quality, containing anything from 10 per cent. to 30 per cent. of unsound beans; and until the planters adopt some means whereby they can be certain of turning out their “fair fermented” with an even 10 per cent. only of unsound beans, Bahia will go back against the improved output and increasing quantity now being exported from the British Colony of the Gold Coast* and elsewhere; yet the fault, as with the rubber up in the Amazon, is easily avoidable, and should never have existed at all.

Thus we go back to the beginning of all things. To put her house in order, to keep her grip on the world's demand for her products, especially rubber, Brazil *must* have a much larger population, at least where the rubber is produced, *i.e.*, along the Amazon Valley; better still if this increased population is extended to Ceará, Matto Grosso, and Rio Grande do Norte, but before she can increase her population she must increase her home-grown food-stuffs. It is a matter of life and death, therefore, for the rubber industry of the Amazon, for these districts to secure an ample supply of workers and people to

* Which exported 17,296 tons = 38,743,000 lb., of cacao in a single month, *i.e.*, January, 1915.

develop her resources. Cannot we take it as a happy omen that Japan, on the other hand, is in as critical a position with regard to her over-population; this is agreed to by the leading London papers. "The English-speaking people," wrote the Tokio correspondent of one of the leading London dailies—I believe it was the *Morning Post*—"will have to be reasonable with Japan and do what they can to assist her in the solution of her problem of emigration." "In the past few years," wrote *Current Opinion* of New York, "the rate of increase in the population of Japan has leaped to over a million a year. The Anglo-Saxon people cannot go on for ever enforcing congestion of population upon Japan by rejecting her immigrants, and at the same time refusing her the right to extend her territory." Japan has done much to help the world; let the world now, including Brazil, help Japan, particularly when they have everything to gain by so doing, Brazil in particular. Anyone, therefore, who stands up at the mouth of the Amazon and refuses admission to the Japanese and Chinese to take their place alongside the *Caboclo* and Indian, will make a serious mistake, and when the rubber industry of Amazona is buried beneath the overgrown luxuriance of that greatest of all stranglers, the tropical growth of the forest, the blame will be on the head of those who are stupid enough to believe that their own selfish interests will be injured by the advent of these helpful folks from the other side of the Pacific. Will not Brazil take the opening of the Panama Canal as another omen of good luck, of the supremacy of thought and science over Nature in thus opening the gates of the two Americas to the East for the surplus population there, to come and develop the West and make it a leading centre of production and a hive of industry?

So-much for the people, now for the produce, to obtain reliable supplies of which these new-comers are necessary.

If I jot these notes down as they come to hand I hope my readers will excuse me, but I would say the reason of my so doing is that they are only rough ones to remind you of what can be grown in and around Brazil, not altogether to urge you to try all of them. Local conditions vary immensely and so no general advice can be offered; each settler must experiment with his own lands and according to the buyers, actually at hand or in the future; all I now profess to do is to suggest that the following crops could be and should be planted in the Valley of the Amazon, in Ceará, and Matto Grosso, &c., and then leave my readers, wiser than I am, to see which crop suits best, or if something else will be better. Take ground-nuts (*Arachis hypogæa*), for instance, known to the French as *arachide*, to the London urchins as monkey-nuts, and to the New Yorker, I believe, as pea-nuts, whilst in Peruvian it is *ynchi*, and Spanish *mondubó*, or more commonly *cacahuete*. Although India turns out huge quantities of this crop, Brazil could well do with some, especially in the near future, when vegetable oils are used as fuel in internal combustion engines, whereby the most inaccessible backwoods up the Amazon being quite independent of mineral oil, coal, or wood fuel, could generate all the power required for a sawmill, farm machinery, &c., and even to run the boats up and down to Manáos, Pará, and the other ports and river towns.

By means of a machine recently placed upon the market and apparently giving satisfaction, gas for lighting, cooking and heating, in the same way as coal gas, can also be made from any kind of oil—mineral, animal or vegetable, so that my idea of planting oil-yielding crops extensively can, apparently, help to light the houses and cook the food as well as drive the machinery in use.

“The soil best suited to ground-nuts is a sandy loam, with free subsoil drainage,” Mr. F. G. Spring, the Agriculturist

to the Department of Agriculture at Kuala Lumpur (F.M.S.), tells the readers of the Department's *Bulletin* for November, 1914 (p. 64). "The land must be changkolled or forked to a depth of about 7 in., and the surface soil brought to a fine tilth by breaking up the lumps of earth. The nuts are shelled and the seeds sown at distances of 18 in. apart each way, and at a depth of about 1 in. In this country they seem to do best when grown on the top of flat ridges; little after-cultivation is required beyond weeding, but this must be carefully done so as not to interfere with the nuts which are developed at a small depth under the soil. The crop should be ready to harvest in about four months. The nuts are collected when the leaves begin to wither. When collected, they should be spread out in the sun in order that they may be thoroughly dried before being stored. An important point to be remembered when growing ground-nuts in this country, is to plant at such a time as to ensure harvesting in the dry weather. Silt, ashes, and cattle manures are suitable as manure when available."

Mr. Spring also discusses maize, yams, and sweet potatoes as follows. Taking the last first, he tells us: "The land requires to be cultivated fairly deeply to permit of the proper development of the tuber. They may be grown on flat ridges, which should be about 3 ft. apart. The stem cuttings are planted on top of the ridges at distances of about $1\frac{1}{2}$ ft. If grown on the flat they can be planted in rows about 2 ft. apart each way. The tubers may also be used for propagation purposes, but the former is the general method. Weeding, in the elementary stages of its growth, requires to be well attended to. The crop is best lifted during dry weather.

"With yams, which in some countries form a standard diet both for Europeans and natives, being more nutritious than the potato, these are one of the most important foods of the Tropics. Some twenty varieties of yams have been grown at the Kuala Lumpur Experimental Plantation, and although

on a small scale, it was sufficient to indicate which soil and climate are ideal for the proper development of the tubers. Suitable soils are sandy loams, but deep cultivation and good drainage are more important than quality of soil. The land should be forked or changkolled, and if possible manured. The soil is thrown up into ridges 3 to 4 ft. apart, and the seed tubers planted on the ridges at distances of from $1\frac{1}{2}$ to $2\frac{1}{2}$ ft., depending on the variety. Near each plant is placed a stick for the creepers to grow upon. The stick should be from 12 to 16 ft. above ground. A common practice is to plant up trees for support. When this is done, pits are dug near the trees, fresh soil and manure being put in after each crop. It is not unusual to allow the plants to trail on the ground, but this method is supposed to reduce the yield slightly. The crop takes from nine to eleven months to mature.

“Coming now to maize, or Indian corn, the green cobs of which form an excellent vegetable, while the ripe grain is largely used in the preparation of special articles of food, this valuable cereal needs rich soils for its growth, or at any rate they are the most suitable, and should be deeply cultivated. The seed is sown broadcast and lightly turned under, 10 to 15 lb. generally being allowed to the acre. Little attention after cultivation is required other than weeding. The crop takes from three to five months to mature, according to the variety. If the crop is required as a vegetable the cobs are pulled while green, otherwise they are left until the leaves surrounding them become shrivelled. Suitable manures are burnt earth, bone dust, and cattle manure.”

On the other hand, Mr. C. P. Hartley, in the *Farmers' Bulletin*, No. 400, of the United States Department of Agriculture, when discussing “A More Profitable Corn-planting Method,” tells you (quoting the *Agricultural News* of Barbados) that when Indian corn is planted in hills, a much better yield may be obtained if the plants stand a few inches

apart, that is to say, if the seeds are dropped a few inches apart instead of being dropped together, in one hole. The *Bulletin* shows that each corn plant needs some 5 or 6 in. of root space on all sides in order to obtain a firm hold in the ground, and that when the plants of a hill are very closely bunched together, they are easily upset by the wind, and the roots of one plant interfere with those of the others.

The arrangement recommended is the planting of four seeds to the hill, these being placed with reference to each other as at the corners of a 5-in. square. It has been found that when corn is planted in this manner a better yield is generally obtained, and the plants are stronger against high winds. For the experimental planting of corn in this manner Mr. Hartley used a board in which were inserted four funnels, placed as already described at the corners of a 5-in. square; a handle of convenient length for carrying the board was attached to its centre, and the kernels were dropped singly in each of the four funnels at each hill. It was found that a minimum increase of yield of 2 bushels to the acre, or about a 4 per cent. increase, was the result of this method of planting. Mr. Hartley estimates that a planting machine arranged to drop the grain as described in these experiments would be paid for by the increase of yield in one year on a 50-acre crop of corn.

In September, 1912, I published an article in *Tropical Life* on "Vegetable Oil—the Oil of the Future for Motive Power in the Tropics," which I regret want of space prevents me from reproducing here*; but I would remind those

* This is also the case with the papers on "Farming with Dynamite," which I contributed to the New York Rubber Congress in 1912, and the Batavian Rubber Congress last year (1914). The New York paper has, however, been included in the official proceedings of the Congress known as "The Rubber Industry," but the Batavian paper, though published, has not yet come to hand.

who think that the inaccessible parts of the Amazon must be kept back until railways or river steamers and coal can reach them *ad lib.*, that it has been agreed that "the huge possibilities of the internal combustion engines constructed on the lines invented by the late Dr. Rudolph Diesel, being able to use vegetable oils as fuel, may quite possibly, in time, alter the entire geographical distribution of the industrial centres of the world, for in that case the nut plantation of the future will bear the same relation to the factory that the coal mine does now."*

In France engines have been worked with the Diesel type of engine for three years, more or less; in Russia castor oil is used, and both these can grow freely in Brazil. Castor oil is there on all sides, and, according to de Sornay†, the ground-nut was certainly discovered in North America, and is generally believed to be a native of Brazil, although, no doubt, the original plants which were carried from Brazil into other countries have undergone certain modifications, so that it can well be believed that such-and-such a variety arose in such-and-such a country. The soil most suitable for this crop is a light one, so that the roots and nuts or nodules can roam about at will; a soil well broken up, but rich in humus, as much of the land between Pará and Peru, or in Ceará and Matto Grosso must be, should prove, if other conditions are suitable, ideal for the crop, especially as the ground must not be too dry; on the other hand, beware of an excess of moisture. The question of climate has to be considered, the ideal temperature being 25° to 27° C. Careful seed selection is of the utmost importance, and see that you start with the variety most suited for your

* *Chambers's Journal*, 1912.

† *Tropical Life* Publishing Department, a book on "The Leguminosæ Family and Green Manuring," by de Sornay. In the press.

individual lands; what suits your neighbour may not do for you. The yield varies: the best crops in Senegal range from 2,700 to 4,000 lb. per acre (I am still quoting from Mr. de Sornay's coming book), in Algeria from 2,200 to 3,500 lb. In Bombay the average yield for five years has been 5,000 kilos, say 11,200 lb., per hectare, or 4,480 lb. per acre; whilst the percentage of oil runs as follows:—

PERCENTAGE OF OIL IN GROUND-NUTS.

Senegal	...	...	...	...	...	44·7 per cent.
United States	..	...	...	...	...	38·6 "
Egypt...	...	...	..	..	..	41·7 "
Congo...	..	...	..	..	...	40·3 "
Bombay	...	...	..	...	..	43·0 "
Spain ...	...	...	...	...	..	43·2 "
Mauritius	...	...	...	...	..	40·0 "

When first breaking up the land a crop of ground-nut forage could be grown to keep down the weeds (planted in rows 30 or 36 in. apart and the plants 15 to 18 in. apart in the rows, for the running—as opposed to the bunch or upright—kind), and later to be fed to stock instead of the coarse, tasteless, and unnutritious grass at present abounding on the savanna lands along the banks of the rivers. Again, owing to its habit of running along underground (whence its name), ground-nuts improve the mechanical condition of the ground, as the roots help to break up and aerate the soil in a way that is unobtainable otherwise.

Then we come to soya-beans (*Glycine hispida*),* which have already been tried in the neighbourhood of Manáos and are doing well, whilst the *Review of River Plate*, some time back, was recommending its cultivation in Argentina, urging as a reason for so doing that present supplies are not equal to the demand. Acclimatized seed gave 869 lb. to the acre (in Argentina), and I understand that the bean can be

* According to de Sornay, the Kew Index recognizes three species of soya or soja, under the genus *Glycine*, say, *G. hispida*, *G. soja*, *G. javanica*.

harvested there within 110 to 115 days after sowing, against 150 to 180 days in Manchuria.*

"For the following reasons," wrote my friend, Mr. E. H. Heron, who has had great experience in the production and introduction of economic products in several tropical centres, "the soya-bean has, during the past few years, since the Russo-Japanese War in particular, risen from comparative insignificance in European countries to being a product of great importance. The beans contain a high percentage of oil, which can be used for edible purposes or in the manufacture of soap; whilst the residue is used in the manufacture of cattle cake and meal. As a fodder plant it is rich in nitrogen, albuminoids and fat, and is fed in the green state as hay and silage. Under favourable conditions the plant may reach a height of 4 ft. or more, rising 3 to 5 ft. high, as a rule, and bears prolifically, say 1,100 to 1,600 lb. per acre, whilst at the Government Experimental Farms in South Africa an output as high as 2,000 lb. has been recorded, a good average yield of pods per plant being forty, whilst some are said to yield 100 pods. As a forage crop it gives, under favourable circumstances, 12 tons of fresh fodder to the acre, but since there are supposed to be over 300 varieties, it behoves the planter to see that he secures the one most suited to his soil, climate, &c., putting down experimental plots here and there, in the first place.

A report was issued in 1913 by the Trade Commissioner

* Argentina is also investigating the *Jatropha curcas*, an oleaginous plant that grows to the north and west of Corrientes (see *Journal of the London Chamber of Commerce* for February, 1915), as experiments made tended to show that this plant was resistant to drought and is not attacked by locusts and ants; it can also be cultivated with but little labour, and gave 1,800 to 2,700 lb. of oil per acre, as it showed 49.3 per cent. fat on analysis. Brazil might, therefore, also be glad to keep an eye on this plant, especially the Cearenses.

of the Government of the Union of South Africa, with a view of encouraging the cultivation of this useful crop out there. It would be a good thing for Brazil to secure a copy of this and, translating it into Portuguese, have it widely distributed throughout the Republic. Anything and everything contained in its seven pages (foolscap size) is worth noting, and at the same time it gives enough information for anyone to start on.

Perhaps, before going on to the next note, it may be excusable to include the following, prepared by Mr. H. C. Quodling, Acting Principal of the Queensland Agricultural College, Gatton, to show the amount of the various seeds required to sow an acre of land :—

Name of crop				Drilled	Broadcast	Approx. distance between drills. Inches
				Lb.	Lb.	
Wheat	...	...	...	40 to 45	60 to 65	7
Barley	...	...	...	40 „ 45	60 „ 65 (green feed)	7
Oats	...	...	...	45 „ 50	60 to 80 (hay)	7
Rye	...	...	...	40 „ 45	50 to 60 (green feed)	7
Canary seed	...	...	...	12 „ 15	20 to 25	7
Maize	...	...	...	8 „ 10	50 „ 60	48
Sorghums	...	...	...	3 „ 5	15 „ 20	36 to 42
Broom millet	...	...	...	3 „ 5	—	36 „ 42
Setaria and the finer growing millets	...	...	...	10 „ 15	20 to 25	7 „ 14
Lucerne	...	...	...	12	15 „ 16	7
Essex rape	...	...	...	3 to 5	—	21 to 28
Swede turnips	...	...	...	2½ „ 3	—	30
Cow-peas	...	...	...	10 to 12	—	36
Mangel-wurzel	...	...	...	6 „ 8	—	30 to 36
Potatoes	...	...	...	896 (8 cwt.)	—	36
Rhodes grass	...	...	...	—	5	—
Prairie „	...	...	...	—	30 to 40	—
Flax (linseed)	...	...	...	30	—	7
Field peas	...	...	...	20 to 25	—	21 to 28

Stock-raisers of cattle, pigs, poultry, &c., will find both soya-beans and ground-nuts of great value as a feed, either as a green forage or as cake or meal. Both, and especially soya-beans, can be grown satisfactorily with maize, and if grown for silage the two can be cut together. The per-

centage of the oil (in soya-beans) varies greatly : some talk of as low as 10 per cent., others of over 20 per cent., but with 12 per cent. to 15 per cent. its cultivation should still pay well.

As regards the future prospects of vegetable oils, I again go to a recent issue of the *Indian Trade Journal* (of February 18th, 1915), that ever-jealous watch-dog over the interests of India and her economic products, wherein I found the following statement : " Taking the world's production of coconut and copra oil at 377,000 metric tons, and deducting the amount estimated as used in the United States at 38,000 and other countries 30,000, an American official report estimates that there remain for Europe 309,000 and North Europe 200,000 tons. Palm-kernel oil, made in North Europe, amounts to 125,000 tons, not more than 40,000 tons of which is made edible, so that the total supply of hard vegetable fats for margarine is 240,000 tons. This might increase to 300,000 in 1914. Out of the 347,000 tons of hard fat used in 1913, 204,000 was vegetable. The vegetable hard fat used in 1914 may amount to 300,000 tons, the total visible supply. ' This,' says the *Oil and Colour Trade Journal*, ' intensifies and perpetuates the war of the edible oil trade with the soap kettle. Soap will always use some proportion of these fats, but it cannot keep the pace set by margarine. These interests will have to co-operate to extend the sources of supply and to divide the qualities and kinds in the interest of final mutual economies. This may tend toward turning most of the animal fats to soap. *In any case, there will certainly be a wider exploitation of tropical sources of various palm-tree oils.*"*

Whilst making use of what India is doing in theory as well as practice, regarding the exploitation of vegetable oils,

* The italics are mine.

I would like to call attention to the report issued by the Bombay Government and commented on by *The Wealth of India* "on the survey of the oil-pressing industry by its expert, Mr. Y. G. Pundit, who has had considerable experience of the industry both in India and the United States of America. After detailed and extensive inquiries Mr. Pundit offers many useful suggestions for those directly interested in the oil industry and has specified scientific agricultural methods for increasing the production and methods of extraction, comparing the economic aspects of the several processes of oil extraction. He advocates the formation of associations like the Central Oil Seed Crushers' Association of America, and strongly urges the establishment of a bureau of publicity for advertising the merits of the product and by-products of the seeds crushed."

Now let us take the sweet potato (*Ipomœa batatas*), which should do well on the river banks and further inland, at the same time providing a pleasant change to the everlasting farine, or *farinha*, since it probably contributes a larger part to the food of the great mass of the people living in the smaller West Indian Islands than any other foodstuff,* and if not at first suitable for the water-logged lands on the Amazon, since good drainage is essential, it should do well elsewhere in Brazil.

The soil best suited to the cultivation of the sweet potato is a moderately fertile, sandy loam. Its requirements are, however, modest, for a fairly good crop can be grown on soils that are too poor for the production of most roots or cereals, especially when sweet potatoes are used in rotation with leguminous crops. With the potato, as with other crops, judicious rotation conduces to success. The plant wants lime and dislikes an excess of moisture, so that

* *The Agricultural News*, Barbados, W.I., January 2nd, 1915, p. 4.

probably one of the reasons for the very general planting of sweet potatoes on ridges is to secure better drainage.*

In the West Indies sweet potatoes are grown almost universally from cuttings, though the small tubers that are now used as food for hogs might be employed for that purpose.

This vegetable easily spoils and does not keep well, though this difficulty can be overcome if the temperature is not above 80° to 85° F. The most important factor in keeping them is careful handling. They should be dug without cutting or bruising the tubers. If possible, the digging should be done on a bright sunshiny day, so that the potatoes may lie exposed to the sun and the wind for a couple of hours before being taken to the storehouse. In harvesting and storing, sweet potatoes ought to be handled as carefully as if they were eggs. Before storing they should be graded, the main object being to separate from those intended to be stored for any period all the cut, broken, or bruised roots, as well as those that are extremely large or too small.

A crop may, under favourable circumstances, be obtained in from three to four months from planting, so Mr. H. F. Macmillan tells us in *The Tropical Agriculturist* for December, 1914. In harvesting, the vines should be cut before digging up the tubers, and what are not used for replanting should be buried in the ground. A yield of about 250 to 300 bushels per acre is considered a fair average yield when cultivated systematically. According to Sir George Watt, a return of about 6 tons per acre may generally be obtained in India. It is best, of course, to plant the crop in rotation

* The United States Department of Agriculture at Washington, D.C., has published several pamphlets on the sweet potato, including *Farmers' Bulletins*, Nos. 324, 520, 548, &c.

with other crops. It has been found that if planted after a leguminous crop the yield is greatly increased. As a catch crop or ground-cover the plant seems well adapted, and on areas where weeds cannot be kept under control by manual labour the planting of sweet potatoes would effectually answer the purpose and at the same time provide an article of wholesome food.

In the April (1915) issue of *Tropical Life*, a Queensland correspondent, discussing agriculture and coco-nut production in the Solomon Group, tells us that "The cost of feeding native labour is comparatively small, as most of the food, such as yams, taro, and sweet potatoes, is grown upon the plantations and serves as a cover crop to keep down weeds among the young coco-nuts. Rice and biscuits with tea and sugar are served out every day and meat twice a week. On quite a number of plantations cattle have been imported and are doing exceptionally well. Feed is there in abundance. The animals serve a double purpose, viz., to keep down weeds, thereby saving money and lessening the ration bill." Reading this, one is bound to compare the state of affairs in the Solomons, which are only now starting to be utilized, with Brazil that has been in the hands of the "whites" for so long, and with which they have done so little, so far as its economic development is concerned. Put each *seringuero* and *vaquero* on a level as regards rations with the Solomon Islanders and then there will no longer be any question as to whether rubber collection will pay up the Amazon.

The Philippine Agriculturist and Forester, which is run under the direction of Professor Copeland (Dean of the College) by the Student Body of the College of Agriculture, Los Baños, Philippine Isles, devoted an entire issue (vol. iii, No. 6, 1914) to discussing the cultivation, varieties, and utilization of the sweet potato, and this number, coming as it does from such an experienced and painstaking source,

should find favour in Brazil, for, as with cattle, &c., the large numbers of half-wild and certainly prejudiced and ill-trained races to be found in those Islands and in India, makes any work carried on at such centres as likely to be of special value to the Amazon.

The *Philippine Agriculturist* gives the following table as regards yields, not in the Philippines, but at various centres in the United States, say:—

Crops obtained in	Bushels	Acres	Bushels per acre
North Carolina ...	5,781,587	68,730	= 84
South „ ...	3,369,957	48,831	= 69
Georgia ...	5,081,678	70,620	= 72
Virginia ..	4,470,602	40,681	= 110
Alabama ...	3,457,386	—	= —
Texas ...	3,299,135	43,561	= 76
Mississippi ...	2,817,386	36,169	= 78
New Jersey ..	2,418,641	20,588	= 113
Louisiana ...	1,865,482	27,372	= 68
Tennessee ...	1,571,575	27,372	= 67

Average yield per acre 82 bushels.

Against all this we are told by Señor Apolonio Muñoz, the author of the article (assisted by his brother Emigdio and sister, Señora Loila Muñoz), that a good yield of sweet potatoes in a good season, as quoted by the United States Department of Agriculture, is from 400 to 600 bushels per acre, and that a yield of 800 to 1,000 bushels has been obtained in experimental tests. These small returns in North America are similar to what that country does in wheat and the (so-called Irish or ordinary) potato, since she is said to obtain only 15 bushels of wheat to the acre as the average of her total output, against 28 bushels in Germany and 20 bushels in France. With Irish potatoes our American cousins gather in, it seems, only 80 bushels to the acre, against 190 in France, 226 in Germany, and 286 bushels in Belgium, taking the average of each country's output as a whole. Talking of Irish potatoes reminds one that the *Colonial Journal* of London for January, 1915, told its readers that “There are many accounts at present of the

ways in which Germany has achieved industrial success, but we do not think that sufficient credit has been given to one of her resources. This is the potato. Vast quantities of this product are used for making spirit, and the industrial position of the country largely rests on this abundant and cheap supply. Some 45,000,000 tons of potatoes are grown annually, and a considerable portion is dried in factories and used as a food for both men and cattle. This dried stock is now forming a very important food reserve, and is being largely used in the making of bread.

“We hear of potatoes being used in Germany in the production of bread, and they are not a bad addition to wheat flour, which is generally treated in such a way as to become rather indigestible. But a much better addition would be banana flour. This is cheaper than wheat flour at any time and under present circumstances may be much more so, whilst as a foodstuff it is excellent. A good bunch weighs about 65 lb., and when dried and ground yields 8 lb. of flour.”

I have discussed ground-nuts, soya-beans, sweet potatoes, or *camotes* as some call them, but I really cannot go into a systematic discussion on bananas as well; those who need full information on this fruit or vegetable, which should be found on every tropical homestead, will find all they want, and more probably than they expect to see, in Mr. William Fawcett's book,* which discusses not only the cultivation of the *Musa* family, but also its utilization for trade purposes and in making banana flour, fibre, cellulose, spirit or alcohol, &c.

Another crop that the *seringuero* and settler in Brazil should plant freely is the *tania*, known also as *yautia*, &c.,

* *Tropical Life* Publishing Department (p. 287), 8s. 6d., post free.

and in America as "dasheen"; then there are yams, pigeon-peas, or dhol or dhal (*Cajanus indicus*), cow-peas (*Vigna catiang*),* and grain (*Phaseolus mungo*), which has been cultivated in India for thousands of years, and can be used for "humans," parched or ground into flour, and when green is good for stock, whilst the plant stems also can be crushed and used as fodder; the variety *radiatus* is said to fetch the highest price.†

The Washington Bureau of Publications has issued several pamphlets on the tania or dasheen, including one telling you not only how to cultivate it, but also how to use it as food, instead of flour, potatoes, asparagus, spinach, &c., since it can be baked, stuffed, scalloped, boiled, mashed, candied, or turned into soup, pies and puddings. What an ideal crop for the *seringuero* or *vaquero* up the Amazon, who seems now to live mainly on *farinha* and buys even that at the store.

Supposing for the moment that, having broken up the flat lands between the bush or forest and the river, you now come to the forest lands. These (as the illustration on p. 268 shows) offer no child's play to clear and drain, so one has to think how to proceed.

If large areas of the more easily accessible forest land were in the hands of private owners or could be claimed by them, then I would suggest that, as in Hungary, a law be introduced to enable the State to develop them when the owners cannot or will not do so themselves. In Hungary, according to Károly Schmidt, of the Forestry Department there, when the owners of communal and other forests could not bestir themselves to bear the expenses entailed by the plans of management without burdening their estates with a

* Or *V. catjang*.

† W. G. Freeman, in the "World's Commercial Products." Sir Isaac Pitman and Sons.

mortgage out of proportion to their incomes, it was necessary to make the provisions of the forest law capable of practical application. For this purpose a supplementary law was introduced, by virtue of which small and large communes possessing forest property of an area of at least 5,000 arpents (7,110 acres) only have the right of maintaining forests at their own expense if they can include in their budgets the sums necessary for the management of the woods, and if the exploitation proves profitable. If this is not the case, all these forests shall be under the Forestry Department, to which the owners have to pay an annual tax.

Later on, in Brazil, when the forest land is slowly cleared back, cattle, pigs, &c., could well be grazed on the land, as in Hungary. There cattle-breeding is a huge industry and a system of grazing forests has been elaborated, according to which the requirements of the stock-breeders can be satisfied, as far as the state of the forest and its soil permit.*

Regarding the clearing and drainage of forest areas to improve the health of the trees and men alike, it would be well for Brazil to go East and learn what they are doing there to assure the health of those on the estates, for if Brazil can teach the East how to prepare rubber, the East has much to teach those "out West" with regard to health and sanitation in the Tropics. To begin in a small way, it was recommended that householders in Malaya should encourage bats and house-sparrows to breed in or near dwellings, as both these (so-called pests in some centres) have proved themselves to be effective in mitigating the danger or nuisance of swamp-flies and other insects, whilst bat manure is so valuable and so easy to collect that "batteries" have been designed in order to encourage these

* *The Journal of the International Institute at Rome.*

animals to collect together where desired. These "batteries" are erected on a strong post, like a dove-cot or pigeon-house, but instead of having holes for the birds to get in and out of, the sides are louvred or fitted with jalousie laths.

Dr. Malcolm Watson, a tower of strength "out East," would, like Colonel Goethals, be a valuable ally in Brazil; but I fear that the face of the Eastern Planting Associations if Brazil proposed to borrow Dr. Watson as the East "borrowed" Brazil's seeds in 1876, can be far more easily imagined by my readers than I am capable of describing it to them.

When I suggest that, instead of planting up fresh areas, Brazil as a Republic should undertake the opening up and drainage of the rubber forest (on lines similar, perhaps, to those adopted in India), one of the first things that would need studying *in situ*, and compared with similar work elsewhere, would be the science of subsoil drainage as a safeguard against insect pests and swamp sickness generally. *The Malay Mail* of October 23rd, 1913, I remember, had an excellent letter on this, forming one of several communications on this most important subject, and I have no doubt that since then substantial steps forward have been taken towards further improvement in the matter. Subsoil drainage, we were told, has been in use for generations to dry swamps and excessively moist soils that cannot be adequately dried by open drains. Although silt is valuable for cultivated lands it is a nuisance and expense when not wanted, and when its presence has to be avoided, subsoil drainage must be adopted by means of iron or rough earthenware pipes. This is costly, but with valuable rubber areas and the rivers close by it should pay well in many places. Again, those who know the Guianas, English or Dutch, will agree that they are not so very far from Brazil; and when one

thinks of how the open drains there are utilized as canals to transport crops, &c., surely it is not too Utopian to suggest that Brazil should follow suit, and so clear its rivers as much as possible for transport, whilst draining the shores. The idea is, of course, a big one, but I believe it to be perfectly feasible, speaking both from my own experience as well as from what American water and pumping engineers have told me or written me on the subject. The last communication I had, agreed that, whilst my idea of draining and otherwise reducing the dampness of the lands along the Amazon and its tributaries constituted an enormous undertaking, it was no greater a one than similar feats that had been attempted and achieved, not only under the direction of the State and Federal Governments in the United States, but also by private enterprise. In California in particular, I was told, in what is known as the Delta regions, or at the confluence of the Sacramento and San Joaquin Rivers, many thousands of acres have been reclaimed by the simple expedient of building earthen walls about the boundaries. The reclaimed lands for the greater portion of the year are below the level of the water immediately outside the levees. Irrigation is effected by merely opening a valve in a pipe passing through or over the levee. This may appear to be comparatively simple, but, as a matter of fact, the engineering problems involved tax the ingenuity of many of the best men in America. By this means, however, land that was worth nothing—an acre, or oftentimes purchased for \$10 (an acre), was at a cost of \$100 (per acre) for reclaiming, converted into fertile fields on which any bank will gladly loan \$1,000 an acre. The problem of the storage of flood waters is, I believe, purely a governmental matter in the United States, and outside official circles comparatively little has been done, so far as I know; at the same time, water engineers in Brazil should study Sir W. Wilcocks's account

of his work in Mesopotamia,* where is situated the true delta of the rivers Euphrates and Tigris, which are in flood in March, April, and May, followed by a season of burning and rainless months in June, July, and August. Here he tells us how he made provision for excessive floods on the one hand and stagnation of the collected waters on the other. The genius of man that has brought the Nile, Euphrates, Tigris, and other big rivers to heel, can no doubt do the same with the rivers of the Amazon Valley.

"The work which you are suggesting shall be undertaken interests me," wrote another American friend; "while I am not familiar with the Amazon region, my knowledge of conditions in Central America would lead me to think that it is entirely feasible, both from an engineering and a financial point of view, by selecting suitably situated lands for enclosure, assisted at certain seasons of the year by pumping plants to convert these semi-swamps into land suitable for any sort of tropical agriculture. It is feasible, I believe, not only with lands that are not submerged during the rainy season, but even with the areas that are inundated at times. The experimental work in this line has been thoroughly covered, and to prove successful you will only need to employ engineers who are familiar with the work."

"From what I can gather of the big drainage schemes in North America, ultimate success depends entirely on the subsoil. If this is fairly solid so that draining the surface water off will provide a condition of surface soil which will permit the moving of implements over it, then the reclamation

* Price, with large maps and plates, 20s. Spon and Co., Ltd., 57, Haymarket, London, and 123, Liberty Street, New York. See also such reports as the *Proceedings* of the Seventh Session of the United Provinces (India) Co-operative Conference, held last December (I think) at Benares, especially the section referring to the part played by the Agricultural Department of that district, in the introduction of improved water-lifting and removal appliances. •

proposition will work out all right. In Illinois, when they want to undertake a big drainage scheme, they arrange by a taxing method to put through one large drainage canal extending for several miles and having its terminal in a river. Into this canal they drain the surface water from the country around by a system of under-drains. This is arranged by putting in drainage pipes from 6 to 10 in. in diameter, put deep enough underground to allow the surface to be cultivated without interfering with or in any way injuring them."

"Your ideas are good," writes a fourth American friend, who specializes in drainage work, "and you have an excellent proposition, the success of which will depend on the condition of the strata in the subsoil." These being the opinions of men who know the work, I hope those who wish well for the future of the Amazon will study the subject fully and see what can be done out there.

All this, I know, will take time and money, but I am equally sure, if the money is not squandered and robbed, such a national undertaking would pay, if not rushed at at first. Do the work by degrees, £100,000 or more being voted per annum for forestry work and rubber exploitation, even advancing a portion of this, or a larger amount, when necessary, to approved settlers, to be refunded later in the form of a special tax for an agreed number of years. The clearance of surplus vegetation in the forests would alone render such areas 100 per cent. more healthy, if not more; when this can go hand in hand with the drainage of the soil, substantial improvements should result, at any rate on small individual-owned areas suitable for cultivation as a start. Special attention should be paid to ravines and upper lands with a view, when possible, of catching the water and running it off before it finds its way to the flat, swampy lands lower down, where the extra water would further complicate the drainage question. Once the forest is opened

up "some," and surface water disposed of, the kerosene oil spray could often be used with advantage if any pools still exist in hollows to invite family parties in the mosquito world to take up their abode in such spots and breed families as numerous as they are undesirable.

Going back to the question of mosquitoes and insect pests, an expenditure of 2 per cent. on the capital, or, say, of one-fifth of the annual dividend, is calculated out East to do much good along the following lines. "The entomologist and bacteriologist," concluded the correspondent in *The Malay Mail*, "have a wide field of investigation open to them, and we shall hope to hear of a serum (as well as sparrows and bats on the land, and frogs and 'millions' (fish) in the ponds or streams) for inoculating mosquitoes in the same way as virus for rats, so that a few captured specimens may destroy whole broods. Again, investigations regarding the plants, whose juices form the food of these insects, might lead to their eradication, and so also help in the extermination of the pests." The above is but one of many examples of how man is fighting Nature out East; fighting and slowly winning all along the line. And what is being done there and in the Panama Canal zone can be done in the Brazilian forests; not all at once or by voting huge sums and buying machinery and appliances before even looking at the forests, as that would only mean feeding human parasites, but by fighting the hardly more objectionable blood-sucking insect parasites by patience and skill, by science and care, expending money only when absolutely necessary. Far more can be done first by expending brain power, and then, after you have come to grips with Nature with your naked hands and learnt exactly what to seize and what to avoid, call in labour and time-saving appliances to help you, and so reserve your main expenditure until the last. No one is a greater believer than I am in utilizing mechanical

methods when possible; but of this I am certain, that when man goes to wrestle with Nature in the primeval forest, the first two or three rounds must be only between himself and her, and art and science can then come along and help after he has had a fall or two and knows exactly when and where to go straight in and when to skirt round his adversary.

Knowing of the shortage of really good bat-willow in this country and having always had the idea that these trees might do well in some portions of Brazil and up the Amazon, I wrote to Mr. W. P. Ellmore, the willow-expert, at Leicester, and asked him his views on the subject, receiving the following reply: "I think there can be no doubt about the suitability of the Amazon district for bat-willows, providing the drainage is good; once this is secured the trees should quickly grow and develop wood of an excellent quality. If this should prove to be correct, then it would be good to note that as much as 14s. per cubic foot has been paid for the butt end, which is the only part used for high-grade bats. The length required for a bat is 2 ft. 4 in. and 3 ft., and these are usually obtained from trees rising 7 ft. high, whilst some trees give as many as four lengths. I have even known of trees grown under exceptional conditions in England which, at 10 years old, averaged 10 in. in their quarter girth and realized £3 11s. (71s.) each. The tops are sold for posts and rails for fencing.

"From all I can gather of the conditions out in Brazil, I should be disposed to say that the trees would arrive at a marketable size in twelve years from the time of planting. Prices at present for the English-grown article are ruling very high, and are likely to remain so for a number of years. I do not know how the season in Brazil would run, but the willow cuttings or rooted plants can be shipped from here at any time between November and the middle of March, but whether these dates would correspond with the suitable

planting season up the Amazon, I am not prepared to say." Those, therefore, willing to make experimental plantings of willow cuttings up the Amazon can gather from Mr. Ellmore's remarks the soil and conditions required, as well as the prices realized in England for "choice stuff."

The Mysore Forest Administration Report for 1913-14 shows that the year was an exceedingly prosperous one, whereby a considerable sum was added to the revenues of the State; this is what we want to see done in Brazil from sources other than rubber. The Mysore revenue was derived from timber, sleepers for the railway, sandal-wood, &c. "Simultaneously with the issue of the above report," the *Madras Mail* tells us (issue of February 4th, 1915, p. 101), "the Government has published an Order sanctioning the Village Forest scheme, which originated as the outcome of the report furnished by a Special Committee, and was probably the result of a similar experiment that is being tried in this (the Madras) Presidency as a result of the report of the Forest Committee. The object of the Mysore scheme is much the same as that of Madras, namely, to secure the co-operation of the ryots in the protection and improvement of the lands from which they have been accustomed to draw their supply of fuel, timber and forest produce for domestic and agricultural needs, and to induce them to take a greater interest in a more economical and well-regulated use of the forest resources at their disposal. The scheme will at first be introduced tentatively for a period of three years in selected localities, and the Revenue and Forest Officers in these areas are directed to take a sympathetic interest in the Panchayets to be formed and to help them with advice and guidance."

Surely this is a scheme that should be watched and discussed by Brazil, and if there is a chance of a similar plan being likely to prove successful in Amazonas, to give it a fair trial, not only in one place, but in a dozen or more.

In the paper contributed to the London Rubber Congress (July, 1914) by Mr. A. Irving,* in which he carefully compared the methods existing on the Brazil *seringals* with those in the East, I particularly noted the following sentence, as tending to further prove the advantage, and in fact the necessity, of clearing the Brazilian forest of its rank surplus vegetation, *i.e.*, of the removal of the luxuriant but greedy, strangling growth which shuts out light and air, hides snakes and numerous other pests. "With the plantation tree of the East," he goes on to say, "the ground is kept clear of all forms of vegetation, unless it be some catch or cover crop, which is kept far enough removed from the young trees to ensure non-interference with their growth. The result of those conditions is clearly shown in the great difference of time needed by the wild tree compared with its planted rival to mature. From observations I have made, and from information gained on the spot, twenty to thirty years seems to be the very least that could be expected, with the wild Hevea, to produce a tree of tappable dimensions, whereas with plantation rubber it is a frequently recorded fact that trees can be tapped profitably at the age of four years."†

Talking of raising stock in forest lands, a note in the *Gaceta Rural*, of Buenos Ayres, for August, 1914, by M. Hvenegaard, is of interest, as he claims to have obtained very good results in the Argentine with a system of rearing

* "The Rubber Industry," p. 45. *Tropical Life* Publishing Department. Price 15s. 6d. Postage on 55 oz. extra.

† I quite agree with all Mr. Irving has said, but at the same time it is my opinion, with both cacao and rubber trees, that if you make use of them too young you exhaust them at a much earlier age, and so lose in the end. It is the same with people. Those races that marry and bear children at an age that finds English "misses" still at school, soon deteriorate and lose their good looks, becoming either very thin and haggard or abnormally fat, in any case of less use to the world at large.

pigs in movable pens and to have obtained an average of twelve pigs per sow per annum with a herd of 1,000 sows.

The pen measures 9 ft. 9 in. by 6 ft. 6 in. and is 2 ft. 9 in. high; it is made of six 2 by 3 in. uprights, to which are nailed four rows of 1 by 3 in. bars, $7\frac{1}{2}$ in. apart; shelter is provided by a piece of corrugated iron at one end sloping from the top bar to the second bar, and by two other pieces fixed to the lower three bars below it. The $7\frac{1}{2}$ in. space allows the young pigs to pass to and fro. A trough of 5 gallons capacity is placed in each pen. The cost of such a pen does not exceed 15 pesos (about 26s.)

The pens are placed in lucerne fields 20 yards apart in rows 120 yards apart. Litters of different ages should not be allowed in the same row, or the bigger ones will enter the pens of the younger and interfere with their sucking. When breeding is carried out all through the year 100 pens are sufficient for 300 sows. After the pigs are weaned the sows are allowed to pasture with the boar (one boar for each twenty-five to thirty sows), and the sows near farrowing are removed to the pens each week.

The pens are moved each day to provide fresh, clean pasture; three men can move 100 pens in an hour. Fresh water is supplied each morning and about 7 lb. of maize is allowed each sow in the afternoon. Weaning takes place at the age of $2\frac{1}{2}$ to 3 months, and to simplify the work it is better to wean those of a row at the same time. After weaning, the males are castrated, and all are marked and given an insecticidal bath. They are then put out to pasture until 1 year old.

At least one shed, 25 by 6 yards, should be provided for every 1,000 pigs to afford them shelter in bad weather. From $\frac{3}{4}$ to 1 lb. of maize per head is allowed daily. At 1 year old they should weigh about 110 to 150 lb.; they may then be fattened if desired by turning them into a

maize field. With a good crop of maize 250 acres will fatten 1,000 pigs in two to four months. During this period the fattest are chosen and sent to the market. If possible, the crops should be arranged so that the lucerne fields surround the maize crop, thus enabling the pigs to prevent an attack of locusts.

The economics of this system under Argentine conditions are as follows (taking the dollar at 1s. 9d.) :—

CAPITAL EXPENDITURE.

6,200 acres at about £5 12s.	...	...	...	...	£35,000
Buildings, &c.	...	...	...	...	8,750
1,000 sows at £3 10s.	...	...	...	...	3,500
40 boars at £8 15s.	...	...	...	...	350
First year's expenses	...	...	...	...	6,562
Total	..	...	...	...	<u>£54,162</u>

ANNUAL EXPENDITURE.

Interest on capital at 8 per cent.	...	...	...	...	£4,333
Labour : 8 or 10 <i>peons</i>	...	...	...	...	875
Maize for rearing purposes	...	...	...	...	3,500
Cultivation of 2,200 acres of maize for fattening	...	...	...	...	1,312
Sundry expenses	...	...	...	...	1,355
Total	...	...	...	...	<u>£11,375</u>

RECEIPTS.

10,000 pigs, weighing 220 lb. each	...	...	...	...	£28,875
Profit	...	...	...	...	<u>£17,500</u>

The Argentine is not Brazil, especially the Amazon Valley, but for all that the above can be digested by Brazilian stockmen, and in face of the indifference pigs have for snakes, a few thousands running wild in the forests might do useful service there, and also provide many a pleasant meal to the *seringuero* on the look out for an addition to his larder.

Coming to cattle, the Ongole variety of the Indian zebu cattle (*Bos indicus*), which is largely bred in the Guntúr district of Madras, should be noted, as this breed has already been imported into Brazil as well as into Argentina, Java,

and Africa. It is the only breed with which any definite breeding experiments have been carried on in the Philippines. It has been imported by local dealers and by the Bureau of Agriculture, which experimented with these cattle at the La Carlota Station, Occidental Negros Province, at the Trinidad Stock Farm, Benguet, in the Sub-Province of Bukidnon, and at Alabang.

The results have been excellent. These animals showed a high resistance or apparently nearly complete immunity to rinderpest, immunity to tick fever and a resistance to insect pests nearly equal to that of the native animals. In all sections, excepting those at high altitudes where the temperature is comparatively low during the rainy season, these animals have exhibited remarkable qualities of thrift and hardiness, superior to those of the native stock; they have proved also successful for road and light field work. Their crosses with the native stock are highly resistant to rinderpest; they are a great improvement in size and conformation over the native dams and exhibit to a great degree most of the desirable characters of their zebu parents.

In many respects Indian cattle are not to be compared with improved European and American breeds, but they are far better adapted to existing conditions in the Philippines and elsewhere in the Tropics, and do excellently in the British West Indian Island of Trinidad, where they are quite an institution and I have had a good deal to do with them.

Importation of European stock for breeding purposes has taken place upon a fairly large scale into Brazil, according to the *Journal of the (London) Board of Agriculture*, both by the Ministry of Agriculture and by private stock-breeders with Government aid. Since 1907, São Paulo seems to have been carrying out investigations to test the value of European stock for crossing with the native breeds, of which one of

the principal is the Caracu cattle, a good healthy breed of Portuguese origin, which is being further steadily improved by the introduction of pedigree stock, and the results of crossing these with the native breeds are said to be most gratifying.

Those interested in cattle-breeding in Latin America, and especially in Brazil, should study this report* carefully, as they would learn much from it, both as regards the breeding and crossing of the cattle and the establishment of meat factories and packing establishments. The vast plains, especially in the south of Brazil, are described as being eminently suitable for the raising of cattle on a large scale, and one concern alone is said to own 85,000 head, besides 150,000 wild cattle. Needless to say, this company has recently imported large numbers of pure-bred animals for the purpose of improving the breed of the native cattle. The openings for trade between Brazil and breeders of pedigree animals on this side, therefore, promise to become, with careful management, as important as those established with Argentina.

Meanwhile the following official figures are of interest, showing the number of live stock (in 1912) in Brazil, which is given as follows :—

Cattle ..	..	22,467,000	Goats ...	...	6,886,000
Pigs ...	...	11,968,000	Horses ...	...	4,955,000
Sheep ...	...	11,801,000	Mules ...	...	1,681,000

The above, I should add, are in respect to the States of São Paulo, Rio Grande do Sul, Bahia, Minas Geraes, Espiritu Santo, Santa Catharina, Sergipe, and Parana.

A great advantage to be derived by the districts concerned from the encouragement of cattle and pig, &c., breeding is that it offers a useful and remunerative employment for the women and children, especially when the bread-winner is no longer there to protect and maintain them. Even when he is alive the money they can earn and the additional

* *Journal of the Board of Agriculture*, March, 1915, pp. 1079-1086.
Whitehall Place, London, S.W. (Price 4d.)

food they can bring to table is both welcome to their tastes and advantageous to their health.

Thus it is we come to the question of meat and of milk supplies, an important adjunct to the food of even the labouring classes, especially since we want our *seringueros* to rear up healthy families as well as breed them, in order to increase the population and enable them to grow up strong and vigorous. Those who are in the habit of receiving the Brazilian publications on stock-breeding and cattle-raising will agree that there are several excellent departments in Rio, São Paulo, and elsewhere to go to for advice and experience and to form a nucleus for further studies, so there is no need to dwell on what has already been done within the boundaries of the Republic.

Turning, therefore, elsewhere, I would strongly recommend those who wish to see cattle-breeding on a popular basis advance over an extended area in Brazil to turn to the monthly lists of American publications from the Philippines and their other colonies, or from the United States themselves, issued by the Bureau of Publications at Washington, D.C., U.S.A. Valuable information is also obtainable from our own Board of Agriculture, at Whitehall, England (over which, be it remembered, Sir Sydney Olivier, who has had many years' experience in the full Tropics—first as Colonial Secretary and then as Governor of Jamaica, a stock-raising centre—holds sway as permanent Secretary), the International Institute at Rome (which publishes its *Bulletin* in many languages), and many other centres, whose names can soon be ascertained, even if not already known.

Take as an instance the Joint Report (*Bulletin* No. 56 of the Department of Agriculture, Bombay)* issued by Mr.

**The Indian Trade Journal* of November 12th, 1914, devoted six pages (262-267) to a discussion of this report, and their remarks are most helpful to those wishing to "spot" the points of the industry:

J. B. Knight, M.Sc., Professor of Agriculture at Poona, and Mr. E. W. Horn, Manager of the Government Civil Dairy, on the present state of the dairy industry in the Bombay Presidency, which contains much useful information regarding what can be done in so tropical a centre as India.

The most extensive dairying (in the State of Bombay), we are told, is carried on in the districts of Kaira, Ahmedabad, and parts of Baroda, where the cultivators keep a large number of buffaloes in herds of from three to twenty, to produce milk for the separating stations. In Gujarát the animals are grazed and cared for by the women and children (as I would like to see done in Amazona), and fed on cotton seed, which is abundant. The buffaloes produce well, and the returns are looked upon by the producers as nearly net profit (as they should be in the West also). The military department has established a large central butter factory in Ahmedabad; there are smaller dairies at Poona, Belgaum, and Kurrachee, as well as a civil dairy at Kirkee. Some of the butter factories are combined with a milk and sweet cream business.

The breeds that suit Indian dairies or farmers might probably not do so well in Brazil, although, of course, the hump-cattle do well in the West Indies, especially for crossing with other kinds. The native Venezuelan cattle run too small to be truly profitable, or to leave as large a profit as they could and would do if they were improved and made heavier by cross-breeding with imported cattle, as is done in Brazil, and especially in the Argentine, and has been started in Africa as well. A good carcase, *i.e.*, without hide and offal and head, should weigh net at least 800 lb., and better still 1,000 lb. In India the Gujarát cattle are heavier (the Konkreji variety running around 1,000 lb. for cows and 1,200 to 1,500 lb. for bulls) than those in Kurrachee,

which weigh 600 to 800 lb. for cows and 900 to 1,100 lb. for bulls. These low weights are probably owing to the animals being bred under harsh conditions of climate, soil, and feed; they do not do well in wet areas, as the damp seems to reduce the quantity of milk, the yield increasing again "when the sun comes out." As regards actual yields, the cattle at Poona average about 200 gallons (2,000 lb.), whilst selected animals have given even 3,500 lb., and one cow with her third calf gave as much as 4,700 lb. (470 gallons). Of course, the latter are exceptional, and all the cattle are good beasts and selected for their yields.

Forest dwellers in Brazil might possibly be interested in the breed of buffaloes and cows to be found in the Káthiáwár forests in Bombay. These are described as being of medium size; the cows weigh 800 to 1,000 lb. and the bulls up to 1,200 lb. The animals (known as Gir cattle) are described as being of a loose build, coarse in bone, with an abundance of loose skin. They are inclined to be leggy and have large, soft feet. Under suitable conditions they give large quantities of good milk, but (and this can be noted in the damp Brazilian centres) they do not do so well in the drier plains. Those tested at Poona gave an average of 2,000 lb. (200 gallons), with 3,687 lb. (368 gallons) as the maximum, in a year. A bigger type of these Gir cattle are larger in build, being described as the largest bovine domesticated in India. A full-grown female weighs from 1,600 to 1,800 lb., and the bulls scale 2,000 lb. upwards. They are heavy milkers, giving a rich milk, but also fall away in dry areas. Selected animals have averaged 350 gallons, and one has given up to 543 gallons in a year. Owing to their immense size they consume much fodder, and where this is scarce they are avoided.

Another breed, which comes from Northern India, is known as Murrah's or Delhi's, weighs from 1,000 to 1,200 lb., and at

the Government Farm gave an average yield of 300 gallons, with a maximum of 600. The manager of the military dairy even reports a yield of 800 gallons in a year from one of these animals. Then the Surti breed, smaller in size and requiring less to eat, gives nearly as much milk, seventy-six animals averaging 278 gallons, with a maximum of 503 gallons in a year.

And so I could go on indefinitely, for I have many notes from many centres, but have given enough here to show those who mean to develop Brazil along sure and safe lines what class of information there is in the world to draw on and where (among many centres) to look for it. What I do maintain, however, is that one of the drawbacks to the Brazilian *seringuero*, or even to the *patrão* himself, getting his rubber at a reasonable cost, is the cost of meat of any description, and the total absence of fresh meat, except what comes from the forest. Again, as we want, in time, to open up, drain, and render more healthy these rubber-yielding centres, we also want to increase the population. To do this it is necessary to "save the babies." The most hardened woodsman was a baby once, and if he is but one in a thousand, or even in ten thousand, who has been hardened off, all the more pity. I want to see reared up many strong and acclimatized men and women out of tens, not only out of thousands, and therefore recommend Brazil to experiment with water buffaloes from the Philippines, Borneo, &c., and the Gir cattle from India (or any other breed) that might possibly be able to live and breed in or around the *estradas* (if they break away and go wild all the better for the hunter), and so enable those engaged in the rubber or other industry to secure at least a portion, if not the whole, of his meat supplies locally, and at the same time provide healthy supplies of milk for the rising generation, whether Indian, negro, Japanese, or Chinese; brown, black, yellow, or white.

The December (1914) issue of the *Bulletin* of the Inter-

national Institute of Agriculture at Rome starts with a six-page article on the "Present State of Cattle-breeding in Uruguay," contributed by Sres. Teodoro and Juan Alvarez. In this they discuss the history of the industry, the improvement of the cattle and markets for the sale of the products. Uruguay is, of course, entirely different to the Amazon Valley, but at the same time it was interesting to note the splendid work done in the more Southern Republic with Durham bulls crossed with the *Criollo* cattle since 1860. The Durham, it seems, is much esteemed down there and produces crosses which attain weights of 1,100 and 1,320 lb. when fattened on the pastures, whilst the meat fetches as high as 2'rd. per lb. live weight. The Hereford bull came thence in 1864, and is preferred by many breeders, especially in the North of the Republic, because it is more suitable for the open country; whilst the Devon, introduced into Paysandu in 1874, has not spread much, but has found a good market in the South of Brazil, where it is imported to improve the native breed.

Neither has the Polled Angus breed spread much (in the district of Salta), "notwithstanding the fact that it has become perfectly acclimatized and yields excellent meat," add Sres. Alvarez. As the lasso is still used for handling the cattle, the lack of horns, perhaps, accounts for its limited distribution in Uruguay. The following breeds have also been imported: Polled Durham (in Paysandu), Ayrshire, Simmental (at Piriapolis), Jersey (at Toledo in 1887, where it is bred pure for the production of milk), Dutch (in the district of Canelones), already fairly widespread in the country; Red Flemish (in 1910), Black-spotted Flemish (imported from Argentina in 1912). But of all the milk breeds the most widely spread is the *criolla*, common in the whole of Uruguay. It has a lactation period lasting five or six months and yields about 1'32 gallons of milk per day.

This same *Bulletin* also contained a useful seven-

paged article on "The Forests of Chile," by the Inspector General of Forests, Hunting and Fisheries,* Santiago, (Señor Frederico Albert), which is instructive; whilst on pp. 1664-5 they call attention to an article in the *Atti della Reale Accademia Economico-Agraria dei Georgofili di Firenze*, Series 5, vol. xi, No. 4, pp. 283-310, Florence, October, 1914, in which Signor G. Tassinari describes "A Metayer's Family in Chianti, Tuscany," which worked 17 acres of arable land with vineyards, fruit trees, and olives, and 87 acres woodland and rather steep pasture. I was very interested in this; the principle could be utilized in many centres. The farm products (those from the woodland being excepted) and the profits on the live stock are shared equally with the landlord, who provides half the cost of the seeds required and pays the estate taxes. The taxes on live stock are shared by the tenant and landlord. The house, garden and firewood are regarded as free allowances to the tenant, and the landlord is charged with the cost of fungicides. The annual charges of the tenant are about 400 ft. of trenches for vines, &c., and ten head of poultry.

The family includes six persons, four men and two women. The live stock belonging to the farm includes two oxen, one sow, four pigs, thirty-seven sheep, and six lambs, valued at £100; the dead stock leased includes forage, litter, and manure, valued at £43; implements valued at £12; wine vats and materials for other industries valued at £6; the total, including poultry, reaching about £145.

As regards the lands available, and their drainage for cattle, those seeking to drain and otherwise utilize the Amazon lands for sugar-cane may learn a hint or two from

* What an ideal official for Amazonas if the men and women anxious to carry on these industries would take the trouble to properly learn the work and, having done so, make up their minds to work steadily!

Cuba and our own Colony of British Guiana. "There remains quite an area in Cuba known as the Savanna lands," writes the *Louisiana Planter*, of New Orleans, "corresponding in some ways with the prairie lands in Western Louisiana and with the great prairie States of the North, south of our own Great Lakes. These savanna lands in Cuba we understand to be in indifferent repute, and yet the ease with which they could be brought into cultivation excites one's curiosity as to wherein these lands fail in fertility. On the northern coast of South America, in British, French and Dutch Guiana, there are hundreds of thousands of acres of savanna lands, called by some the great mud bank, that has formed along that coast as the result of the deposit of the alluvium of the Orinoco River. These lands in British Guiana, with which we are more particularly acquainted, have been cultivated for some 200 years and maintain their fertility fairly well. The present cultivators are very much disposed towards intense work and the use of a very large amount of fertilizers, as is done throughout the British West Indies in cane culture."

I have already referred to the great ditches or canals cut in British Guiana to run off the surplus water, and at the same time utilized as a waterway for their iron barges, laden with cane, &c., for the factories. Are there not important areas in Amazonas which can be made as useful as this "mud bank" in British Guiana—when the Chinese and Japs arrive there?

Developing a dairy or cattle-breeding industry in Brazil, as in India or elsewhere, is uphill, and at times a troublesome, almost a disheartening, task. To evolve a sound remunerative industry, spread over a large area, is a big undertaking, even with pasture land, &c., ready to receive the animals; whilst to prepare the land and discover the food supplies for the cattle around many of the settlements

attached to the *estradas* is impossible as things are at present, though we trust that this will not always be so. Meanwhile, I include these rough notes for what they are worth, reminding my readers that there are "tons" more where these have come from, and elsewhere too. Even if every word I have said and each suggestion is utterly unsuited, either for the Amazon States, Matto Grosso, or Ceará, the mere fact that they have been noted, discussed, and cast aside, is all to the good, for then wiser and more experienced heads than mine will know what to avoid, and where *not* to look for what they want. If everything unsuitable to help make Brazil the "land of milk and honey" that it can become, and is already if we knew it, can be advanced and cast aside, how much easier then will be the task of the true expert to take all that remains and make use of it. What is wanted, however, is someone to make a start, and that I have tried to do, even if only to let the cleverer ones see in a flash what not to trouble about.

Professor Copeland, Dean of the Agricultural College at Los Baños, in the Philippine Islands, is even more emphatic in his book on the coco-nut* on the advantages and gains to be derived from hog-breeding on the coco-nut estates than I was in either of the two editions of the book I published with Mr. F. A. G. Pape† on the same crop, and every word that Professor Copeland says in favour of hogs among the coco-nuts is equally applicable to hogs among the rubber trees up the Amazon. "Smith's and Pape's book on coco-nuts," writes the Dean, "contains the most complete and recent compilation of the statistics on the subject, and in its enthusiastic treatment gives the best expression to the business opportunities which the coco-nut offers." Now, what

* "The Coco-nut." By Professor Copeland. 11s. 6d., post free.

† "Coco-nuts—the Consols of the East." By Hamel Smith and F. A. G. Pape. 13s. 6d., post free. *Tropical Life* Publishing Dépôt.

I am anxious to do is to give an equally good expression to the business opportunities offered by the lands along the Amazon, the rubber trees and the area they cover, *plus* the *Caboclo* and the Indian, from Belem (Pará) up to the Peruvian Montaña. On p. 147 of Professor Copeland's book he tells us that "there are also in the Tropics extensive industries in pigs and goats." Goats I dislike, unless penned up, as they live only to do mischief to vegetation; and as my contemporary says, "There is no extensive commerce in goats or any of their products, but this is not the case, of course, with hogs, and there is no apparent reason why the Tropics should not develop a business in pork, lard, &c., the importance of which will be in some proportion to the ease with which the feed of the hogs can be raised. I am satisfied that it is possible to raise hogs more cheaply in the Tropics than in any temperate country, and therefore expect to see the day when pork products, as articles of commerce, shall reverse their present direction of movements." If this is true of a coco-nut grove, it must surely be even more applicable to the Amazon, and not only because of the reasons Copeland advances, or to build up a business in bacon with Europe until the householders pay something below 10d. to 1s. per lb., instead of above that price, but also because of the snakes. Since pigs and snakes could not live together in Ireland, and that is why (we are told) the pigs only remain there to-day, maybe if we have enough pigs the same result may be achieved in time in the rubber forests; for, according to Lange and all those who have been *in* real wild forests, the snakes seem to be as common as sparrows with us. Hogs are easy to feed, they can pick up a living anywhere; even if there can be no coco-nuts, the homesteads I want to see surround the *seringueros'* huts or houses will have, as I suggest, ground-nuts, soya-beans, &c., to supply cake, whilst the river, at a pinch, can be requisitioned to help

even, since *The Agricultural News*, of Barbados, quoting a recent issue of *Nature* (December 17th, 1914), tells us that the use of fish as cattle food may have a novel sound, but it appears to be a common practice in various parts of the world. In Shetland and Iceland dry salt fish is fed to cattle, sheep, and even to horses. So long ago as 1853, Sir John Lawes carried out experiments at Rothamsted on the feeding of pigs with dry Newfoundland codfish. He found that the fish-fed pigs were fat and well grown, and there was a very good proportionate increase to food consumed. Although fish does not compare favourably with ground-nuts, so far as fattening value is concerned, it is suggested that on the coast a considerable saving might be effected by its use.

In face of all this, I hope to see hog-raising become one of the big industries of the small-holder along the Amazon, especially after the Chinese come along and help to erect and run central bacon-curing factories similar to those established in East Africa and elsewhere.
